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Learning by Developing - New Ways to Learn

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Introduction

Vesa Taatila

The theme of the 2012 Learning by Developing - New Ways to Learn -conference was **Creativity in Higher Education**. This topic was explored from two different perspectives: firstly, how can we increase the creative competence in our students and shareholder groups and secondly, how can we creatively develop higher education practices and organizations.

The demand for the creativity of individuals is increasing. Our developed economies rely more and more on constant innovation, capability to invent and implement always better products, processes and strategies. Looking at the current international growth businesses, they are very dependent on experts with high skill levels, good motivation and capability for creative thinking. Thus it is an important question for higher education institutions how can we support the refinement of creativity in our students as well as our other stakeholder groups. The traditional learning environment with a lecturer speaking in front of a large audience is probably not the most effective solution for developing creative competence - what is, then?

This first perspective was studied and discussed in two tracks: **how to learn creativity, and how to teach creatively**.

Learning always depends on the learner, her own motivation and will to develop her skills. Thus it was studied in the conference how does a person learn to be creative? If creativity is required in working life and higher education institutions thus obliged to teach it, it should be something that students can learn and that can be measured. But is it in fact possible to learn creativity? And if it is, how do we measure and evaluate it? This track concentrated on the development of creativity in an individual student as well as on methods and tools for assessing the development.

Despite the unquestionable importance of the learner, a good teacher supports learning very effectively. In the modern ways of competence development learning takes place in various forms. Teaching does not constitute just a teacher's monologue anymore but often consists of numerous creative activities. But how do we use creative techniques and learning environments to teach our students? This track concentrated on the delivery of curriculum, learning and teaching environments, methods and models that have the aim to teach in a creative fashion.

The second perspective was also explored in two tracks: **creative management in a higher education institution, and developing a creative region**.

With the current financial situation combined with an ever increasing need for higher skill levels of graduates, the higher education institutions will need to come up with very creative solutions. Creativity cannot be expected to prosper in higher education without the intentional and determined efforts of the institutions. Thus creativity should be visible also in the management of higher education institutions. Consequently, this track concentrated on creative management practices, strategies and guidelines as well as on the implementation and success of them.

Regional development is one of the key aspects of many higher education institutions as well as private and public sector organizations. In educating the future innovators, higher education institutions also need the

input of external stakeholders. What constitutes a creative region? Is there such a thing as a creative region? This track concentrated on the processes, methods and cooperation in developing a creative region.

This conference was constructed in co-operation with an EU-funded multinational research project, Creative Actions in Learning for Innovation (CAL4INO). The project representatives produced several excellent workshops and abstracts that presented the latest scientific knowledge and practical tools in the topic of creative methods. CAL4INO also brought the scientific publishing house Emerald into the conference. We can all read the results in a special edition of **"Development and Learning in Organizations"** -journal (volume 26, issue 6).

In addition to the excellent abstracts, presentations and workshops, the conference offered also a venue for creating new ideas. It was a pleasure to see how much expert discussions and new research project ideas were shared during the conference. Several new ideas have already been put into action and thus new knowledge on creativity in higher education will increase further in the near future.

On behalf of Laurea University of Applied Sciences I wish to thank most warmly all the contributors of these conference proceedings and wish all the readers enjoyable moments with this publication. I believe that we all can find new thoughts and ideas to be further developed in our own context.

Helsinki, 2012

Vesa Taatila
Vice President
Metropolia University of Applied Sciences

Track 1: How to Learn Creativity

How does a person learn to be creative? If creativity is required in working life and higher education institutions thus obliged to teach it, it should be something that students can learn and that can be measured. But is it in fact possible to learn creativity? And if it is, how do we measure and evaluate it? This track concentrates on the development of creativity in an individual student as well as on methods and tools for assessing the development.

Teaching and Learning for Innovation

Andreas Ninck

Abstract

We are presenting the example of a new problem based master degree course in business analysis and service design. In the future, problem-solvers and innovators will need the ability to break through existing mindsets and to collectively generate new knowledge. In order to successfully think and act within new structures, we must break free from familiar mental models and actions. Systems thinking, self-organized actions, the use of collaborative media, constructive learning and the perpetual formation of new knowledge are vital competencies for innovation as well as for the success of individuals and organizations. As a matter of fact the ability to learn more quickly than competitors provides a decisive and lasting competitive advantage in any given situation.

Situation - Transformation in the Workplace and the Learning Environment

Rapid changes in different areas of life (society, environment, technology, market, etc.) always bring with them still new problems, opportunities and challenges. We know that any form of change will result in making a situation even more complex, and that complex problems can rarely be addressed with tried and tested solution patterns. Future problem solvers will therefore need more than just ex-plicit factual knowledge, such as the kind available in textbooks or knowledge bases. Instead, what is in fact required is the ability to break through existing mindsets and, in a collective process, to gener-ate new knowledge. However, the objective to actively construct knowledge is in direct contrast to the traditional forms of teaching, in which generally the focus is on communicating and reproducing knowledge.

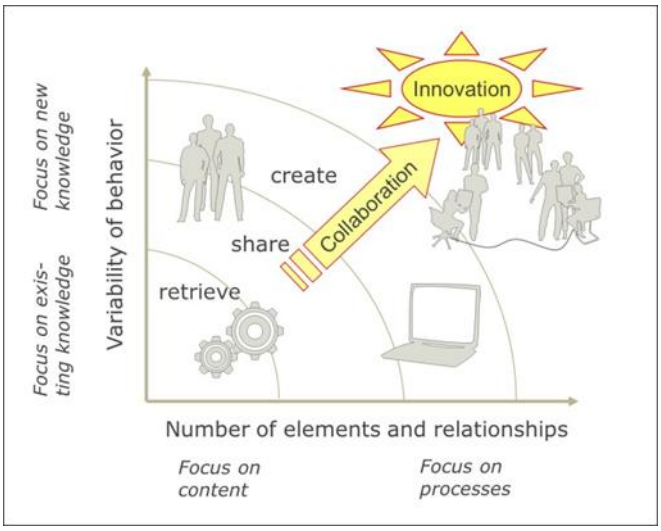
Since September 2008, the Business School at Bern University of Applied Sciences is offering a new Master of Science in Business Administration with a main focus on business development. Together, the two modules 'Business Analysis' and 'Service Design' comprise one unit that take place one after the other in the course of one semester. While designing the new concept, a unique opportunity was available that allowed the department to fundamentally rethink some of the traditional education mod-els and to implement new activity-based study methods. We understand active and problem-oriented learning as the answer to the transformation taking place in the work and learning environment. In brief, the challenges can be characterized in the following manner:

- Increase in complex issues: The problems that our graduates will face in the workplace in the future can be characterized as being increasingly more complex (compare Ninck et al. 2004). This is why our teaching method focuses on dealing with complex systems (a large number of components, a high degree of behavioral variability) and places the spotlight on related methods and process models (compare Fig. 1).
- Conceptual thinking: Even though in terms of structure we still find ourselves entirely engrossed in the transformation from an industrial society to a knowledge society, visionaries are already discussing the next age, which is much farther beyond what we currently understand as infor-mation processing.

Pink (2005) has coined the term he calls "conceptual age". What is meant by that is an age in which factual knowledge and linear thinking are not of primary concern, but in-stead an understanding of interrelationships, communication, empathy and creative collaboration. These factors play a central role in our action learning approach.

- New forms of work: The transformation in the types of problems and solution strategies also has a drastic effect on the working methods and on social systems. What this means for the individ-ual employee is, for example, an increased responsibility for self-monitoring, personal motivation and self-organization. For this reason, our forms of working and learning are shaped by being more focused on the specific task at hand, on team performance and learning through self-reflection.
- Constructive learning: In the past, learning typically involved memorizing and reproducing facts. In the process, declarative knowledge is acquired in a structured form. When it comes to the practical use of the acquired knowledge in complex situations, this way of learning is only partially effective. For managers of the future, in fact, knowledge of practical methodologies and expertise will be the skills high in demand for problem solving. Therefore, we base our problem-oriented approach on completing the transformation from reproduction to production, from knowledge acquisition to the development of skills, from testing to encouraging and from dogmatic teaching to coaching.
- Virtual office: With the latest technological developments, the workplace is fast becoming the "hub in the knowledge society". At the same time, we need to abandon our traditional ideas about working at a fixed location during a firmly established schedule. To prepare students for the demands of their future work environment, they are introduced to the use of synchronous and asynchronous communication media. While the traditional e-learning focused largely on distributive and interactive media, in our lesson plans, collaborative learning methods are placed front and center.
- Learning to learn: Knowledge management is a central task of the knowledge society. To date, the predominant idea has always been that knowledge must primarily be conveyed in an explicit form (books, lectures, etc.). . For future managers, who are confronted with new challenges on a daily basis, we advocate a move away from the institutionalized learning of facts and activity-based learning towards the creation of new knowledge and development of reflection capabilities.

Figure 1: Complexity is the result of a greater degree of behavioral variability. The development of innovative solutions requires collaboratively constructing new knowledge.



Educational Objective – Developing Skills and the Construction of Knowledge

The traditional forms of education applied in the past are slowly reaching their limits as concerns their ability to structure a learning arrangement that will meet the challenges listed above. Educational objectives can no longer be solely based on broad general knowledge. Due to the transformations our society is currently experiencing, it is becoming increasingly more important to develop skills. Classical qualifications are moving more and more into the background, particularly on the level of a master's degree program. By acquiring qualified skills, students are being enabled to implement their formally learned knowledge into rules-based action (know that, know how), which is particularly useful for advancing proven experience and knowledge. On the other hand, as relates to the ability to overcome challenges with an innovative character, what is required, however, are the skills to use reflective action to generate new knowledge in a creative design process (knowing in action).

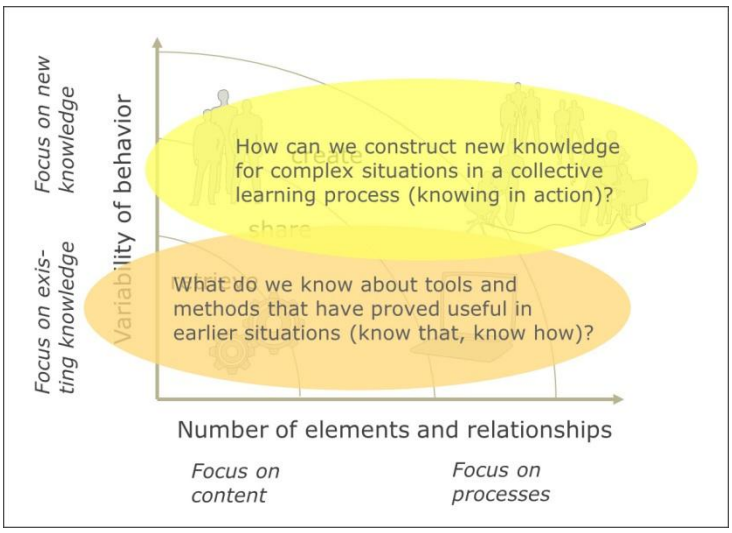
The German Federal Ministry for Education, Science, Research and Technology has assigned a Del-phi study pertaining to the subject "The Potential of the Knowledge Society - The Effects on Educa-tional Processes and Educational Structures' (Prognos, 2006). The interviewed experts emphasized that in the future learning will steadily become a life-long task, which will, in particular, require that each individual in fact sees it as their own personal responsibility. The majority of the experts assessed five points in particular as being factors that will facilitate the acquisition of the skills that will be required in the future: Interdisciplinary, practice-and project-oriented learning, self-directed learning models, media-learning and team learning. Most of the Delphi experts see an urgent need for reform in learning arrangements and learning methods in today's education system.

In order for our students to be prepared for future challenges, they will need to learn more methodically how to solve complex problems, because "all life is problem solving" (Popper, 1994). This will include methods that can be applied to generate ideas, behaviors suitable to overcome conflicts in groups, the experience needed to acquire any information that is missing, the ability to analyze, reflect and to decide what is relevant. However, this also includes large amounts of basic knowledge. Integrated thinking is based on knowledge that is passed along: Where there is nothing, nothing can be integrated. And new knowledge cannot simply be drawn from thin air, but instead, it is the result of a creative combination of already existing knowledge. When a student enrolls in a

part-time master's degree program, it is our assumption the he or she has already acquired a great deal of knowledge and skills. This is why we tend to focus more on developing skills and the construction of knowledge (compare Fig. 2).

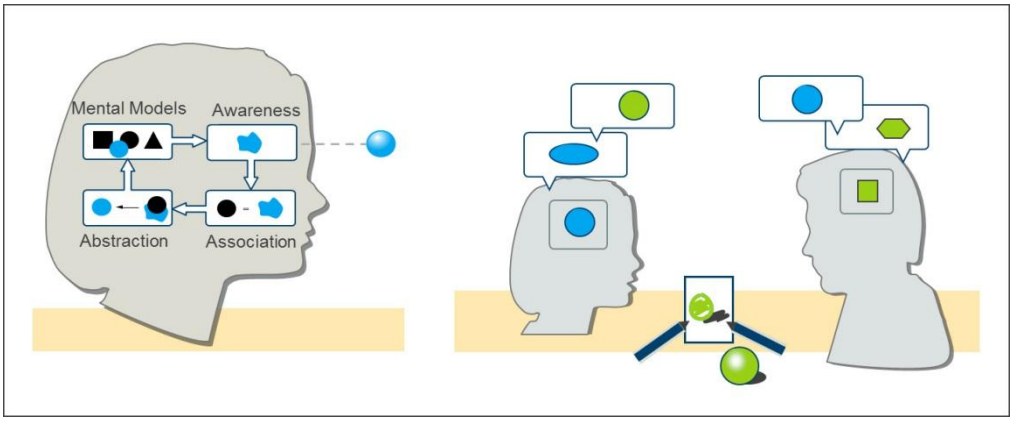
Skills in the manner that we understand the term means the ability to deal with relevant knowledge, to apply knowledge bases, to proficiently utilize methods and have the ability to apply these correctly to the situation at hand, and to effectively put solutions into practice. In our understanding of the term, skills development extends far beyond the classic understanding of vocational skills. To a certain extent, it also includes an ongoing self-evaluation of the student's own actions. In addition, it includes the student's ability to organize the learning process on his or her own. A student's own learning processes as well as collective ones must be set in motion over and over, and also monitored and analyzed. The skills that need to be acquired are essentially a mentality and way of doing things that focuses primarily on the customer, an ability to critically scrutinize and also to approach others, to motivate oneself and others, to cooperate with others, to research relevant information, identify what is essential, to construct new knowledge, make decisions, to implement, with an eye on quality, time and costs, and finally, to present the results effectively.

Figure 2: Knowledge based on experience is suitable for repeated use in familiar situations (below), yet in order to be able to come up with innovative solutios what is required is the construction of new knowledge in a collective learning process



We understand the construction of knowledge within the meaning of constructivism (cf. Ninck et al. 2009). Accordingly, reality is not actually perceived, but moreover it is a construct that we lay out for ourselves based on our own mental models. Learning means nothing more than the continuous adap-tation and addition to the set of mental models we have available to choose from. In this sense, the term communication can be used to express an exchanging and matching of mindsets (Latin: 'com-municare' = share). In consequence, problem solving requires the targeted further development of common mindsets and models. All of these processes require a feedback loop in our minds on the one hand and on the other hand an unceasing amount of feedback from and to all of the partners involved (compare Fig. 3)

Figure 3: Perception means associating with what already exists, learning means constructing new ways of thinking. Mediating artifacts are very helpful when exchanging and constructing mental models



Process Model – Balancing Organizational Processes and Creative Chaos

As concerns the conceptual development, we allowed ourselves to be lead by the ideas of Henry Mintzberg, who in his book "Managers not MBAs" (2004, p.10) states: „Management is craft, meaning that it relies on experience – learning on the job. This means it is as much about doing in order to think as thinking in order to do." Thus, the challenge in the didactic concept of the two modules has to do with finding a way to implement learning by doing or rather a doing in order to learn. In terms of content, the primary question is how innovation can be taught, because any form of solution development must ultimately have innovation as its goal. Innovation literally means "reformation" or "renewal" and means much more than mere creativity: "Innovation is the successful creation and delivery of a new or improved product or service that provides value for your customer and sustained profit for your organization" (Carlson/Wilmot: Innovation, 2006).

With this in mind, the challenge therefore has to do with finding a model for a process to be used in the classroom, which provides an answer to the following questions:

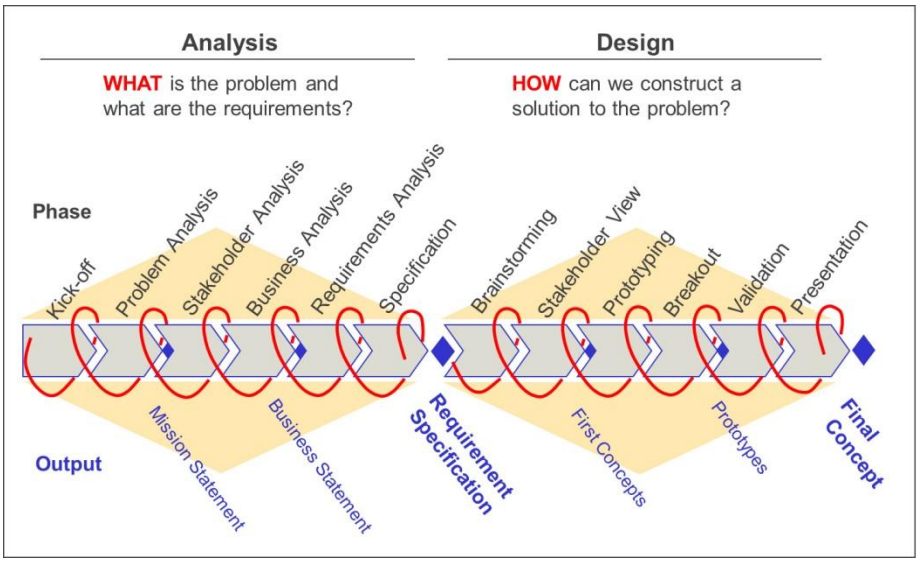
- What does a process model need to look like that is intended to clearly structure the course of a semester or rather the communication process between the practical partners, and yet which in its core allows the students to individually tailor the solution process to fit their own needs?
- How can we go about organizing the process in a way that on the one hand we can incorpo-rate as many needs and ideas as possible in a divergent process, and on the other hand we can keep re-directing the focus again and again, thus converging it towards our goal?
- How should we design a process that encourages the students to repeatedly change the level of abstraction, so as on the one hand to stay close to the problem, and yet on the other to break away from the concrete object and to then develop models of a specific solution?
- How must we organize the learning process so that we do not spoon feed what the students learn by presenting them with a predefined learning path, but instead guide them to take re-sponsibility themselves for what they learn?

In order to be able to do justice to these seemingly conflicting demands, we have defined a process model that can be divided into three sub-processes: General process, learning cycle and reflection cycle.

General process: The two main phases in the process model correspond to the two modules

Busi-ness Analysis and Service Design (compare Fig. 4). The results of the analysis show so-called 'requirement specifications' and reflects the view of the customer. The design concept leads to a rough idea of the solution. As such, we understand design as being a conscious and systematic shaping of objects, systems or structures. Unlike the technical or artistic disciplines, we focus less on the design of products, and more on the design of services.

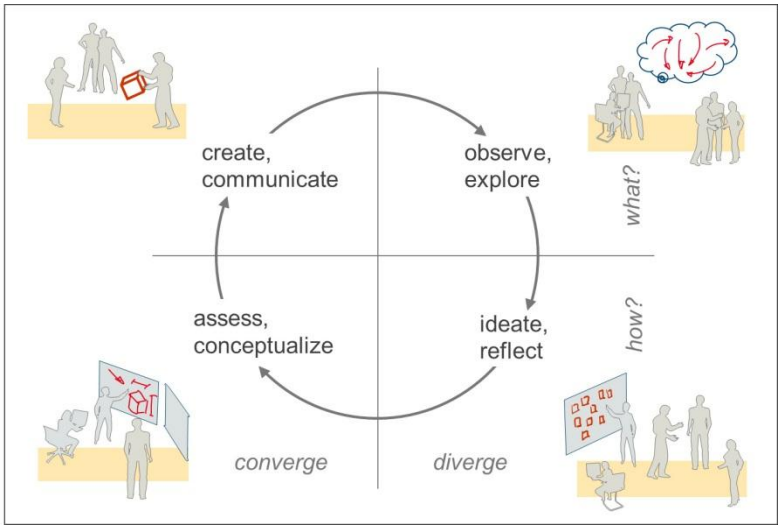
Figure 4: Early Stages in the Innovation Process: The first step is to understand the problem, and not until then to look for solutions.



Learning cycle: Each phase of the process is structured in the form of a learning cycle (compare Fig. 5). At the end of each cycle, a result is produced, which represents the starting point for the next cycle. The development of artifacts (models, scenarios, prototypes, etc.) in relatively short cycles is important for the ability to time the process efficiently and effectively. With each cycle, the solution, building on the outcome of the previous passage, is improved and fine-tuned. In addition to the increased quality of output, this method makes it possible to achieve even more successful expe-riences within the team. However, the artifacts also represent a critical information tool: "The images, maps, and perceptions bouncing around in people's brains must be given a form that other people's images, maps, and perceptions can shape, alter, or otherwise add value to" (Schrage 1995). The cyclic procedure helps us to ultimately resolve the two main requirements stated above: In every cycle there is on the one hand an ongoing exchange between the specific scope of the problem or the solution respectively and the abstract level of models and concepts. On the other hand, the forced interrelationship between diverging and converging thinking triggers so-called "perturbations" (Varela / Maturana, 1990), that is, the deliberate disruptions in the cognitive process that lead to the change in mindsets and to a more creative perception and solution process.

Reflection cycle: What is important is to position oneself at least once during a phase of the general process on the meta level so as to from a bird's eye view be able to take a critical look at the methodology. In order to organize the reflection process, we also focus on the cyclic learning process and, following the four quadrants, we ask ourselves the following questions: What is it I am observing? How am I reflecting about new experiences in light of my insights from the past? How can I draw from the possible differences of new insights, and in what form can I generalize them for future purposes? In what way do I intend to apply the acquired knowledge in the future?

Figure 5: Learning Cycle: Based on the results of the previous phase, each passage will produce a specific artifact.



Implementation – Connecting the Dots between Thinking, Acting and Learning

The learning arrangements are implemented in cooperation with companies that are interested in how a group of four to five students go about developing innovative solutions. At the beginning of the se-mester, students prioritize the subjects according to their content preferences. Based on this, the students then form groups. After the kick-off event, following the process model, each week one specific subject is conveyed to the students in a joint session and subsequently processed by the groups. The instructor is actively involved in the process as a coach. The industry partners are available as a contact if there are any questions. The contact with them is crucial to the quality of the results. Especially in the analysis phase, the goal is to understand the interrelationships between the underlying system and determine the requirements by conducting stakeholder interviews. To the point, the purpose of innovation is just that, nothing more and nothing less - to be able to respond to the needs of the stakeholders with adequate solution concepts.

Classes take place either on site (in joint sessions, in groups), or otherwise, in some cases students even communicate with each other online. Each group has a closed SharePoint area available, to which the practice partners are provided access. Stored there are documents, records and learning journals. Some groups also use the Web Conferencing Tool Adobe Connect, which not only allows a conference call via the Internet, but also supports various opportunities available for interaction (shared whiteboard, application sharing, etc.).

In the iterative spiral model that we propose, the feedback culture is a central component. At the beginning of a cycle, the points of view of different stakeholders are explored. At the end of the cycle, an artifact is generated (prototype, graphics, drawing, etc.) which during the next phase can in turn be used as the basis for communication and feedback. At the end of each phase, the results are presented in a so-called "elevator pitch". This is the brief and concise presentation of an idea, similar to a sales pitch, which is meant to be completed in the time it would take to ride an elevator. An elevator pitch is four minutes in length at the most. The most crucial work steps and results are presented in this time, and yet a portion of this time is also used to reflect on the methodology. These short presentations are intended to prepare students to be ready to collect opinions from outside parties in the next feedback session. However, the presentations are also used to obtain feedback from other students.

The chosen approach provides the space needed for reflection, and does its part to allow those in-

volved to improve the quality of their own reflections. The reflections involve giving close consideration to what took place in the period that was just completed and to what needs to be done in the subsequent period. In particular, what occurs is a systematic review and a look ahead, preferably with the help of a log book or a journal. What has been shown to be an effective method is what is known as the micro-article format. It can be compared to a kind of small newspaper article with a title, a headline, a description of the situation and also insights and conclusions that were drawn based on the situation. This micro-article format can be used, for example, to build a personal knowledge base, for team members to exchange, compare and discuss micro-articles with each other, to increase the precision, consistency and speed of individual and collective learning processes, or to document the learning results of important phases or experiences.

Evaluation – Seven Steps towards a Reflective Practitioner

Comparing the results with what can be found in further reading, what can be seen is that the combination of a linear process model with a cyclical process is not only unique in the classroom, but also in its practical application. Based on preliminary experience, we may assume that the model for the most part does meet our multi-dimensional and in part conflicting requirements. Currently, two groups of students taking part in the master's program are in the process, within the context of research-oriented practical projects, of examining in more detail how suitable the selected approach is.

After there was initial uncertainty due to the complex nature of the methodological approach in the planning of the curricula, and after further evaluation, these concerns have become a thing of the past. Among the industry partners, both an evaluation of the performances as well as the oral consultation have shown that the results do consistently indicate a high degree of quality and that they are relevant for practical purposes. Finally, what is interesting are the results of an evaluation, which focused on finding out among the students their ability to achieve the various levels of educational objectives (inspired by Bloom). The ability to achieve the following educational objectives was assessed using the values 1 (low) to 5 (high):

1. Knowledge – the ability to describe what they have learned
2. Understanding – the ability to explain what they have learned
3. Application – the ability to transfer what they have learned to a new situation
4. Analysis – the ability to analyze a complex situation and to present the findings systematically
5. Synthesis – the ability to condense in a goal-oriented process different ideas into an attempt at a solution
6. Evaluation – the ability when working with adequate criteria to form an opinion about a com-plex situation
7. Reflection – the ability to analyze their own actions and to draw conclusions that can be used to improve results in the future

The results of the evaluation show that the educational unit "Business Analysis & Service Design" came in significantly higher in the points 4-7 than average as compared to other courses. Of course, we are very pleased with the results and they underscore the practical value of our vision of "learning business by doing business". In our mind, there is no doubt that the objective of any form of higher education must be that the graduates are able to find their way despite even the most complex of situations, and have the ability to develop appropriate solutions and to make proper decisions. And what is especially important: Reflection is fundamental to lifelong learning. The ability to learn faster than the competition is perhaps the only truly sustainable competitive advantage!

Conclusion – Problem Solving Skills as a Competitive Advantage

Our action learning approach involves structuring an action-oriented learning environment, which has the ability to closely reflect a real-life situation requiring a solution to a problem. Below we summarize some action skills that students will certainly find very beneficial later on in their day-to-day responsibilities as business managers:

- Communication: The students develop a basic understanding of communication. Based on vari-ous exercises, they become aware that perception is always subjective, ambiguous and constructed. Communication, therefore, not only requires signals to be transmitted and received, but also for mindsets and models of thought to be exchanged and matched. In order to communicate with the wide range of stakeholders, the students develop a number of artifacts in each phase. Their purpose is to be able to grasp these models of thought and thus make them accessible to the discussion partner.
- eCollaboration: The new MScBA is a a part-time course of study. In order for the students to be able to also communicate with each other during work hours or on weekends, they make inde-pendent use of the different tools offered for virtual collaboration. For asynchronous communication, each group has a SharePoint area that they can customize for their own use. For synchronous collaboration, they use the web-conferencing platform Adobe Connect. It provides not only a so-called "shared whiteboard" on which all session participants can write and draw, but it also allows all participants to edit documents. One of the teams has also held several video conferences with a team of developers in India.
- Team development: Increasingly, the groups are showing a growing team spirit in the course of their collaborative efforts. The arrangements of exercises and, in particular, the limited time re-sources force them to clearly define roles. What in particular has proven to be successful in in-creasing the efficiency and effectiveness of the sessions is the fact that each member alternates as the person responsible for moderating these sessions. In the process, the students are taught the following basic rules: Formulating questions instead of simply stating something, democratic opinion forming, objectifying perception, alleviating disruptive situations, avoiding discussions about methodological issues. The process of consciously scrutinizing and exchanging models of thought brings with it a huge sense of team spirit within the group.
- Learning by questioning: From our very first day at school, as human beings we have been conditioned to respond to questions posed by providing the correct answer. The application of proven knowledge (best practice) is surely a useful means to solve recurring problems of a similar nature. However, in order to find innovative and creative solutions, what is required is the ability to actively break through existing mindsets. By focusing on the right questions instead of the correct answers, our approach uncovers any white spots, opens up new perspectives about a specific problem and in doing so, ultimately in a pragmatic way leads to innovative solutions.
- Systems thinking: The stakeholder-oriented outside-in approach used in the process model leads to a fundamental understanding of the system: A situation is considered in its entirety before dealing with it in detail, interrelationships are more important than linear functional chains, the analysis of structural relationships carries more weight than individual events, and an understanding of system dynamics brings with it even more realizations than would the observation of current states of a system. The selected approach with its thorough analysis and questioning in cycles of the intermediate results ultimately leads to system-compatible and viable solutions.
- Problem solving: Graduates of a master's degree program take on functions as professional specialists, as project managers, as management assistants, as executives at the level of a team, an organizational unit or in executive management of SMEs. By systematically processing complex and interdisciplinary problems, they develop strong skills in methodology, problem solving and project management.

- Reflection: The selected problem-oriented approach is more than simply "learning by doing". As useful as practical learning may be to practice an activity performed in a day-to-day working environment (e.g. applying a particular method). In the world of complex problems, taking action alone will not bring with it a learning process. What is needed is the step that involves reflection, so as to be able to discover specifically what has been learned in the problem solving process. What is also needed are artifacts (text, images, models, etc.) in order to make the findings tangible for others.
- Organizational learning: Today's economy is being so strongly affected by its transformation that the environment and challenge requirements are constantly undergoing change. Problems at this level can no longer be solved merely with a set of fixed methods. In this case, what is needed is an ongoing learning process by which to optimize the methodology. However, collective learning is also required if the conditions for further projects are to be improved. Being able to learn faster than the competition provides a decisive, but above all a sustainable competitive advantage.

Overall, the chosen action-oriented approach nets benefits for all of the partners involved. By becoming actively engaged in industry projects, students are given the opportunity to immediately put theoretical knowledge into practice and to thus review what were at first only abstract concepts and methods on a practical level, thereby solidifying the results. The business partners receive a solution to a current problem, which might otherwise have to remain unsolved due to a lack of resources, or for which they might even need to involve the support of expensive business consultants in their search for an answer. And the university will benefit in two ways: first, because in a pragmatic manner it is doing justice to its responsibility to act as a medium between theory and practice, and on the other hand because the approach opens the doors for the university to be able to apply a proven approach in its function as consultant and coach to the business world. It is in fact our vision that the future of education in business management will increasingly take place directly within the corporate world, and that the boundaries between institutionalized teaching at a university level and learning at the workplace will noticeably disappear. Learning without practical implementation is simply dry theory, and work without reflection is a waste of the potential for innovation. Because, in the long-run, only those companies will survive that have the capability to learn faster than the competition.

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The Quest of a Creativity

Jyrki Suomala, Tuomas Toivanen, Sini Maunula & Vesa Taatila

Abstract

Grush (1997) differentiates a sensory-driven image, presentation, from a thought-driven image, representation. The creativity was studied based on Grush theoretical approach. Re-created Guilford's Alternative Uses Task (AUT) served as empirical tool in the study. This tool fits Grush theoretical model aptly, because the source of the creativity in AUT was sensory information.

The subjects of this study were 108 Finnish speaking Laurea University of Applied Sciences students (57 women, 48 men). Students were divided for award group (n=55) and nonaward group (n=53).

Students in award group produced more alternative uses than nonaward group. When previous creativity studies have emphasized that external reward prevents creativity, this study showed, that the information about potential reward increases creativity measured by AUT.

Keywords

Creativity, Alternative Uses Task, Grush model, Reward

Introduction

Emily - a two-year-old girl from New Haven, USA – began to talk to herself before she went to sleep at night. Emily's parents recorded her talk every night and later the researchers uncovered revolutionary features about Emlily's talk: Emily's conversations with herself were significantly more advanced than her conversations with her parents (Gladwell, 2000).

The story about Emily indicates that a human has a capability to further develop sensory driven ideas in the mind. Probably the key for the mystery of human creativity will be the relationships between sensory-driven information and mind-driven information.

The paper tries to raise consciousness on important issue related to creativity and creative representation. Especially the paper reports the empirical findings relating the role of the awarding to the creativity.

Literature review

Human creativity is an essential building block for companies' commercial success and the development of modern society. The main problem in advertising business today is the lack of creativity. Fearing the risks, companies tend to copy the old ideas instead of creating new ones. This leads to similar advertisements and slogans which makes it hard for consumers to tell different companies apart. (Lindstrom, 2009.)

Despite this fact, most of the human studies are sensory-driven. This means that subjects react to ready-made stimuli determined by scientists and the experiment situation does not give any space for subject's creativity. However, the essential feature of the human mind is the capability to treat affairs by imagination and thinking without sensory information. Grush (1997) differentiates a sensory-driven image, presentation, from a thought-driven image, representation. The sensory-driven image is used to provide information about external state of affairs when

the thought-driven image is used as a counterfactual to the sensory image.

Most people spend about 30 percent of their working hours spacing out, drifting off, lost in thought, woolgathering – in other words, watching their own mental videos (mind wandering, Glausiusz, 2011).

Despite thought-driven image is not necessary creative, the hypothesis of this study is that similar mental mechanism is source for human capability to creative new ideas, artefacts and technological devices (Suomala & Taatila, 2009).

In the study, Guliford's alternative uses tasks (1967) were re-created (Guilford, 1967). In the test, a concrete picture of the object is presented for a subject. This object triggers a sensory-driven representation. After that, the task of the subject is to produce as many as possible alternative use for the object. Thus Guilford's test is suitable tool to test Grush theoretical model.

In modern society creativity has become more fashionable than ever before (Toivanen 2012). Therefore companies and societies seek to develop new ways to improve their performance and position in the world. The popularity of creativity can be partly attributed to the prevalence of open markets and a more competitive business environment. The essential question is how does the awarding effect to the creativity? The most common view in the literature is that the external pressure prevents creativity (Uusikylä & Piirto, 1999; Hennessey & Amabile, 2010). In this paper, the role of awarding in the creativity was studied on empirical level.

A human subject is sensitive for the effect of contextual situation. For example, despite the information is same, the way in which the question is worded effects the solution. Well known example about this effect is Tversky's and Kahnemann's Asian disease problem (Tversky & Kahneman, 1981).

Despite the framing effect is common phenomena in psychology and behavioral economics, this effect has not been studied in the context of creativity. In the alternative uses task, the original Guilford's task emphasizes the quantity of the ideas. In this study, we emphasize the quality of the ideas, too.

Methodology

Research problems

Based on this idea, that a human can further develop sensory driven information, we reconstructed Guilford's Alternative Uses Task (1967).
In the study, we had three main problems:

1. How does the awarding effect to the creativity?
2. How does the quality emphasis effect to the creativity?
3. What is the interaction of the awarding and quality?

Subjects

The subjects of this study were 108 Finnish speaking Laurea University of Applied Sciences students (57 women, 48 men). Students were divided for award group (n=55) and nonaward group (n=53). The award group got the task in following way (translated from Finnish): " Please, list as many possible uses for each item. Write the new uses below the each picture. The students, who get best scores, get 20€ voucher for Stockmann, second get 15 € voucher and third 10 € voucher. In nonaward group any information about prize were not told before test. They got the task in following way: "Please, list as many possible uses for each item. Write the new uses below the each picture". However, after test, three voucher were affled among the participants.

In addition, the students were divided also based on quality emphasis criteria. In quality group (n= 47), the students task were generate as original as possible ideas in the test. The task was in other aspect exactly similar than in quantity group. In quantity group (n= 61), only the original test were given and the the emphasis was to produce as many as possible ideas. All other aspect was similar among the groups.

Thus there were four groups totally. The final groups were Award-quality (n=23), Award-quantity (n=32), Non-award-quality (n=24) and non-award quantity (n=29).

Creativity test

In the Alternative Uses Task (Guilford 1967) subjects are asked to list as many as possible uses for common everyday items. In this study the task were presented two different ways (quality emphasis and original number emphasis). In addition, part of the student was told that three of the best students were awarded.

The items were a tire, a lipstick, a coffeemaker, a bottle, a paper clip, a blanket, a watch, a brick, a barrel, a hammer and a wool sock.

Data analysis

In order to answer the research questions, the answers of the students were analysed in four different ways. First, the answers were counted (how many new items the subject has created of one item) and then classified by the level of originality. The volume score of items were counted for every item and will be reported on items level. The originality score were counted for every item in following way. If the new item has created by 11 students or more, the score was 1. If the new item has created by 4 – 10 items, the score was 2. If the new item has created by 2-3 students, the score was 3. If the new item has created only by one student, the score was 5. Then the originality score were counted from every 11 items and then counted for total sum of originality.

Secondly, t-test was used in order to test the differences between the test scores of award group vs. non-award group. In addition, the effect of the quality emphasis has been investigated by comparing quality group and quantity group.

Finally, one-way analysis of variance was executed by tuckey's post-hoc analysis in order to study interaction effect of award and quality emphasis.
The differences between groups have been counted by volume scores and originality scores.

Results

Students in award group produced statistically significantly more new items than non-award group in 5 items. The differences has been found – the award group first - in lipsticks (ka=1,78 vs 1,39; [t(102,730)=2,011,p<0,05]), coffeemaker (ka=1,85 vs. 1,41; [t(105,993)=2,115,p<0,05]), paperclip (ka=2,181 vs. 1,47; [t(99,650)=2,438,p<0,05]), brick (ka=2,31 vs. 1,73; [t(100,459)=2,077,p<0,05]) and of barrel (ka=2,58 vs, ka=1,81; [t(97,867)=2,077,p<0,05]). Table 1 presents the result of this comparison.

Table 1: Mean volume scores of the items of Alternative Uses Task in the groups of award group (n=55) and nonawardgroup (n=53).

	award (n=55)		nonaward (n=53)		
	Mean	Sd	Mean	Sd	Statistical significance
Tire	2,9455	1,98530	2,3208	1,41113	ns
Lipsticks	**1,7818**	**1,10035**	**1,3962**	**0,88447**	**p<0,05**
Coffeemaker	**1,8545**	**1,09575**	**1,4151**	**1,06399**	**p<0,05**
Plastic bottle	2,7455	1,72367	2,2542	1,53361	ns
Paperclip	**2,1818**	**1,72230**	**1,4717**	**1,28008**	**p<0,05**
Blanket	2,4000	1,74907	1,9623	1,27041	ns
Watch	1,1091	1,08308	0,8679	0,94131	ns
Brick	**2,3091**	**1,62016**	**1,7358**	**1,22711**	**p<0,05**
Barrel	**2,5818**	**1,90215**	**1,8113**	**1,35953**	**p<0,05**
Hammer	1,0000	1,21716	0,9057	1,06092	ns
Sock	2,0364	1,55115	1,8491	1,53668	ns
Originality	46,0545	26,86414	43,8302	31,79425	ns
				ns = non significant	

There were not statistically significantly differences between award and nonaward groups in originality score (See table 1).

Students in quantity group differed from quality group statistically significantly in all volume scores. However, the groups did not differ in originality score. Table 2 shows the result of this comparision.

Table 2: Mean volume scores of the items of Alternative Uses Task and originality in the groups of quantitygroup (n=61) and qualitygroup (n=47).

	Quantity group (n=61)		Quality group (n=47)		
	Mean	Sd	Mean	Sd	Statistical significance
Tire	**3,2295**	**1,89203**	**1,8723**	**1,17246**	**p<0,0001**
Lipsticks	**1,9836**	**1,02456**	**1,0851**	**0,74687**	**p<0,0001**
Coffeemaker	**1,9180**	**1,15895**	**1,2766**	**0,90174**	**p<0,05**
Plastic bottle	**2,8361**	**1,55113**	**2,0851**	**1,67889**	**p<0,05**
Paperclip	**2,1967**	**1,68146**	**1,3617**	**1,24106**	**p<0,05**
Blanket	**2,5902**	**1,64699**	**1,6596**	**1,22077**	**p<0,05**
Watch	**1,2623**	**1,10908**	**0,6383**	**0,76401**	**p<0,05**
Brick	**2,2787**	**1,53982**	**1,7021**	**1,30075**	**p<0,05**
Barrel	**2,6721**	**1,68049**	**1,5957**	**1,52742**	**p<0,05**
Hammer	**1,1475**	**1,06201**	**0,7021**	**1,19628**	**p<0,05**
Sock	**2,3279**	**1,54619**	**1,4468**	**1,39578**	**p<0,05**
Originality	**49,6885**	**49,6885**	**38,8298**	**29,26292**	**ns**
				ns = non significant	

The result of the interaction effect of awarding and quality emphasis was that the mean originality score in Award-quantity group (mean= 55,03) differed statistically significantly from Award-quality group (mean =33,56), ($p < .05$). In addition, Non-award -quantity group (mean = 43,73) differed from Award-quality group (mean = 33,56) statistically significantly, ($p < 0.05$)

Conclusion

The main finding of the study was that awarding increases the creativity measured by alternative uses task. The awarding group produced statistically significantly more items in 5 variables. In addition, the emphasis of originality did not increase the level of the originality of the answers. This is important finding, because the emphasis of the number of new items without originality aspect gave same level answer also in originality scores itself.

Our finding support the pragmatic view of creativity in which the idea to produce as many possible uses without any additional quality information helps a human examinees to produce more creative alternative than to concentrate to the quality aspect of product.

In addition, our finding is at odds with previous view of creativity, in which the external rewards prevent the creativity (Hennessey & Amabile, 2010; Uusikylä & Piirto, 1999). However, more empirical study is needed to confirm our results.

At theoretical level, we found that Grush (1997) theoretical model, in which he divided representations to the sensory-driven and thought-driven representations, can be used on empirical level too. We found that Guilford's alternative uses task was suitable tool to test Grush model. In future, the same procedure will be tested in context of neuroscience. By functional magnetic resonance tool it is possible to uncover the brain circuits, which work at the moment of sensory representation and the level of though representation.

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Learning to think "outside the box"

Knut Boge

Abstract

One of the challenges in higher education is how to teach the students creativity; i.e. their ability to think outside the box and beyond standard textbook solutions. Traditional teaching methods, particularly in undergraduate programs, have emphasized the students' ability to reproduce textbook answers. This paper explores what is creativity, if it is possible to learn creativity, and if yes, how to facilitate the students' learning of creativity? One method for facilitating the students' learning of creativity is innovation camps, where cross disciplinary teams of students work together to solve problems or tasks provided by industrial partners. This paper is based on surveys among students who were invited to participate in innovation camps in 2011 and 2012. Exploratory factor analysis of the survey data (n = 108) indicates that innovation camps facilitate different learning outcomes for different categories of students, hereunder learning of creativity.

Keywords

Creativity; Innovation camp; Cross Disciplinary Teams

Introduction

How to facilitate the students' learning of creativity; i.e. their ability to think outside the box and beyond standard textbook solutions? Traditional teaching methods, particularly in undergraduate programs, have emphasized the students' ability to reproduce textbook answers rather than creative thinking. The European Qualification Framework for higher education (EQF) has instituted requirements for development of the students' creativity (European Commission, 2012). The EQF also require that students at all levels learn about innovation and entrepreneurship. Schumpeter (2002, p. 66) defines innovation as development of new technology or new combinations of already known technology used in other fields, opening of a new market, a new source of raw materials or semi-finished goods or new principles for organizing an industry.

This paper explores three questions: First, what is creativity? Second, is it possible to learn creativity? Finally, if it is possible to learn creativity; how to facilitate the students' learning of creativity?

Literature review

Creativity at organizational level is often the subject in innovation studies. Studies of creativity at individual level have often been the psychologists' domain (Lerdahl, 2001, p. 16). Creativity can be understood as a kind of "blessing" for the few (Lerdahl, 2007, p. 13). But Lerdahl rejects this perspective, and considers creativity as a "state of mind" that can be found among persons in all kind of professions under particular circumstances.

An alternative perspective on creativity is the ability to produce something that is new, original, unexpected and appropriate (Sternberg & Lubard, 1991). Boden (1999) defines creativity as the ability to generate new and valuable ideas; Kao (1996) defines creativity as the ability to work simultaneously with contradictory ideas.

Thus, there are close ties between creativity and Schumpeter's (2002) definition of innovation. Creativity can be understood as a necessary but not sufficient condition for innovation.

Lerdahl (2007) claims it is possible to learn creativity, and indicates how to facilitate development of creativity. One approach is the so-called "camp model" (Bager, 2008; 2011) where cross disciplinary teams of students work together for a defined period of time to solve particular tasks or problems, usually provided by external industrial partners, such as private enterprises, public administrations or non-profit organisations. The camp model can be understood as a training camp in creativity.

Methodology

This paper is based on data collected immediately after innovation camps at a Norwegian university college in 2011 and 2012. The tasks both years were provided by the service industry. The idea to this paper was conceived after the first innovation camp in January 2010 when mixed groups of approximately 100 third year Facility Management and second and third year Product Design students interacted and cooperated. Most groups reported about positive learning experiences, and this outcome encouraged a new innovation camp.

A questionnaire with approximately 50 questions was developed after this first innovation camp in 2010, to collect data from future innovation camps. The questionnaire consisted of demographic questions about the students, and questions about the teachers' and the industrial partners' ability to inform and motivate the students for the innovation camp, the students' networking activities during the innovation camp, and the students' learning outcomes. Most questions about the students' information, motivation, networking and learning had six value Likert scale answers. The questionnaire was immediately after the innovation camps in January 2011 and January 2012 sent as Questback surveys to the Facility Management and Product Design students who were supposed to participate in the innovation camp. The questions concerning information and motivation, networking and learning outcomes established three constructs.

The data has been analysed in SPSS Statistical 19, mainly through exploratory factor analysis and direct Oblimin rotation (Hair et al., 1998, p. 87 ff.). This exploratory factor analysis is based the assumption that Product Design and Facility Management students have different learning experiences during the innovation camp due to different emphasis on creativity in their educations. The three constructs' reliability was tested with Cronbach's Alpha, that ideally should be above 0,7. Cronbach Alpha above 0,6 is acceptable in exploratory factor analysis (Hair et al., 1998, pp. 117-118). Items with less factor loads than +/-0,5, which indicates practical but not necessarily statistical significance, were excluded from the factor analysis (Hair et al., 1998, p. 111). Kaiser-Meyer-Olkin's Measure of Sampling Adequacy (MSA) should at least be 0,5, if the data are supposed used for factor analysis (Hair et al., 1998, pp. 99-100). This requirement is fulfilled except in two of the sub samples when the dataset was split between Facility Management and Product Design students.

Results

Approximately 100 students each took part in the 2011 and 2012 innovation camps. Both surveys were sent to 116 students. 54 students answered the 2011 survey (46,6%). 56 students answered the 2012 survey (48,3%). 33 of the students (21 Facility Management and 12 Product Design) who answered the 2011survey participated in the innovation camp. 45 students (21 Facility Management and 24 Product Design) who answered the 2012 survey participated in the innovation camp. Those students who answered the questionnaire but did not participate in the innovation camps were only asked about demographic data and why they did not participate.

Table 1: The students who answered the 2011 and 2012 innovation camp surveys (N=110)

				2011		2012	
Gender	**Education**			**Gender**	**Age**	**Gender**	**Age**
Female	Facility Management	N	Valid	18	18	17	15
			Missing	0	0	0	2
		Mean			30.17		28.73
		Median			25.50		25.00
		Std. Deviation			8.800		7.363
		Minimum			23		23
		Maximum			50		47
	Product Design	N	Valid	20	19	23	23
			Missing	0	1	0	0
		Mean			25.16	..	24.74
		Median			24.00		24.00
		Std. Deviation			4.193		2.767
		Minimum			21		21
		Maximum			40		31
Male	Facility Management	N	Valid	8	8	5	4
			Missing	0	0	0	1
		Mean			30.75		29.25
		Median			27.50		28.50
		Std. Deviation			7.996		5.795
		Minimum			24		23
		Maximum			46		37
	Product Design	N	Valid	8	8	11	11
			Missing	0	0	0	0
		Mean			27.25		26.82
		Median			26.00		26.00
		Std. Deviation			3,882		3.945
		Minimum			23		23
		Maximum			33		34

The reliability tests of the constructs were encouraging. Cronbach's Alpha was 0,739 for the 2011 construct about the teachers' and the external partners' information and motivation (9 items), and 0,718 for the 2012 construct (6 items). Cronbach's Alpha was 0,690 for the 2011 construct about the students' networking during the innovation camp, and its usefulness (6 items), and 0,716 for the 2012 construct (6 items). Cronbach's Alpha was similarly 0,926 for the 2011 construct about the students' learning experiences (15 items), and 0,921 for the 2012 construct (15 items).

What were the main findings in the exploratory factor analysis?

Table 2: The students' information and motivation before and during the 2011 innovation camp (Direct Oblimin rotation, Pattern matrix)

Questions	All students		Facility Management students			Product Design students		
	1	2	1	2	3	1	2	3
8: To what extent did your teachers inform about the innovation camp in January 2011?	.901	-.169	.856	-.246	.161	-.360	-.683	.175
8: To what extent did your teachers explain the innovation camp's purpose?	.913	-.106	.768	.054	-.470	-.915	-.157	.011
8: To what extent did your teachers motivate you for participating in the innovation camp?	.813	.070	.864	-.055	.222	-.545	.164	-.492
16: To what extent did the Dean and the head of the department explain the innovation camp's purpose when they opened the innovation camp?	.537	.159	.671	-.064	-.406	-.127	.106	.900
18: How useful was JA-YE's representatives' creativity exercises for establishing your group at the innovation camp?	.240	.444	.153	.002	.895	.911	-.099	.065
19: To what extent did NN1's presentation explain the industrial partner's challenges?	.388	.610	.714	.352	.219	-.382	.938	-.009
19: To what extent did NN2's presentation of task number 1 explain the industrial partner's challenges?	-.355	.745	.104	.876	-.019	.919	.207	-.215
19: To what extent did NN3's presentation of task number 2 explain the industrial partner's challenges?	-.271	.820	-.130	.852	-.009	.211	.851	.031
19: To what extent did NN4's presentation of task number 3 explain the industrial partner's challenges?	.268	.780	.626	.323	.087	.236	.734	.383

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.649 for all students, and 0.662for the Facility Management students when the dataset was split between the Facility Management and Product Design students. The correlation matrix for the Product Design students was not positive definite when the dataset was split between the Facility Management and Product Design students.

The data about information and motivation before and during the 2011 innovation camp established two components, one with high factor loads for the teachers' information about the innovation camp and one with high factor loads for the external partners' information about the innovation camp. This was also the case for the Product Design students' data. The Facility Management students' data established three components, motivation, task, and creativity.

Table 3: The students' information and motivation before and during the 2012 innovation camp (Direct Oblimin rotation, Pattern matrix)

Questions	All students		Facility Management students		Product Design students		
	1	2	1	2	1	2	3
8 To what extent did your teachers inform about the innovation camp in January 2012?	.924	-.296	-.075	-.980	.806	-.255	-.488
8: To what extent did your teachers explain the innovation camp's purpose?	.884	.010	.007	-.932	.827	-.181	.148
8: To which extent did your teachers motivate you for participating in the innovation camp?	.727	.321	.459	-.539	.822	.088	.204
16: To what extent did the managing teacher explain the purpose of the innovation camp when he opened the innovation camp?	.465	.479	.756	-.101	.657	.555	-.020
18: How useful was JA-YE's representatives' creativity exercises for establishing your group at the innovation camp?	.064	.759	.953	.276	.131	-.115	.953
19: How useful was NN's presentation of the task and the industrial partner's challenges?	-.114	.651	.714	-.246	-.127	.919	-.073

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.624 for all students, and 0.661 for the Facility Management students and 0,481 for the Product Design students when the dataset was split between the Facility Management and Product Design students.

Data about the students' information and motivation before and during the 2012 camp established similarly two components, one about the teachers' information and motivation and one about the external partners' efforts. That was also the case for the Facility Management students. The Product Design students' data established three components concerning information and motivation, the task, and creativity. The factor analysis thus revealed opposite patterns for the Facility Management and Product Design students in 2011 and 2012.

Table 4: The students' networking at the 2011 innovation camp (Direct Oblimin rotation, Pattern matrix)

Questions	All students		Facility Management students		Product Design students	
	1	2	1	2	1	2
42: To what extent did you get to know JA-YE's representatives during the innovation camp?	-.007	.816	.080	.851	.758	-.130
42: To what extent did you get to know the industrial partner's representatives during the innovation camp?	-.033	.825	-.130	.790	.922	.087
42: To what extent did you get to know teachers at other educations during the innovation camp?	.045	.833	.054	.820	.853	.144
43: How useful do you think it is to know JA-YE's representatives?	.839	-.074	.829	-.039	-.162	.935
43: How useful do you think it is to know the industrial partner's employees?	.861	.083	.920	.074	.128	.743
43: How useful do you think it is to know teachers at other educations?	.793	.003	.826	-.024	.392	.539

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.587 for all students, 0.459 for the Facility Management students only and 0,631 for the Product Design students only when the dataset was split between the Facility Management and Product Design students.

Table 5: The students' networking at the 2012 innovation camp (Direct Oblimin rotation, Pattern matrix)

	All students		Facility Management students			Product Design students	
	1	2	1	2	3		
40: To what extent did you get to know JA-YE's representatives during the innovation camp?	.834	.149	.947	.167	.079	.847	.096
40: To what extent did you get to know the industrial partner's employees during the innovation camp?	.877	.034	.880	-.035	-.101	.918	-.019
40: To what extent did you get to know teachers employed at other educations during the innovation camp?	.850	-.117	.439	-.397	.704	.942	-.151
41: How useful to you think it is to know JA-YE's representatives?	.089	.847	.314	.955	-.088	.279	.735
41: How useful do you think it is to know the industrial partner's employees?	-.216	.892	-.246	.831	.232	-.131	.898
41: How useful do you think it is to know teachers employed at other educations?	.198	.588	-.223	.304	.826	.566	.367

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.627 for all students, and 0.513 for the Facility Management students and 0,742 for the Product Design students when the dataset was split between the Facility Management and Product Design students.

Data about the students' networking at the 2011 camp established two components, one about getting to know and one about the usefulness of knowing external persons. Even the Facility Management and Product Design students' 2011 data and the 2012 data as such and the Product Design students' data gave similar results. However, the Facility Management students' 2012 data established three components, one about getting to know, one about the usefulness of knowing and finally the usefulness of knowing teachers from other educations. Most of these teachers teach creativity.

Table 6: The students' learning outcomes from the 2011 innovation camp (Direct Oblimin rotation, Pattern matrix)

Questions	All students			Facility Management students			Product Design students		
	1	2	3	1	2	3	1	2	3
22: How large was your group's benefit from the mandatory supervision at the innovation camp?	-.001	.178	.928	na	na	na	.403	.136	.832
34: How well during the innovation camp did you get to know the students in your group who were not your class mates?	-.212	.883	.078	na	na	na	-.123	.923	.124
44: How was your learning outcome during the innovation camp concerning the industrial partner and the service industry's challenges?	.494	-.091	.349	na	na	na	.300	-.424	.575
44: How was your learning outcome during the innovation camp concerning your group's task?	.857	-.119	.071	na	na	na	.983	-.017	-.061
44: How was your learning outcome during the innovation camp concerning the need for gathering information in order to solve the group's task?	.872	-.201	-.050	na	na	na	.944	-.015	-.077
44: How was your learning outcome during the innovation camp concerning creativity and generation of ideas?	.896	-.082	.046	na	na	na	.919	-.120	.180
44: How was your learning outcome during the innovation camp concerning use of the supervisors as «sparring partners»?	.537	-.147	.434	na	na	na	.718	-.427	.039
44: How was your learning outcome during the innovation camp concerning idea and concept development?	.906	-.009	-.053	na	na	na	.890	-.002	.198
44: How was your learning outcome during the innovation camp concerning problem solving when subject to time constraints?	.804	.129	.171	na	na	na	.859	-.032	.327
44: How was your learning outcome during the innovation camp concerning sharpening of concept and message?	.747	-.117	.317	na	na	na	.565	-.531	.369
44: How was your learning outcome during the innovation camp concerning presentation technique?	.821	-.162	.002	na	na	na	.575	-.699	-.104
44: How was your learning outcome during the innovation camp concerning group dynamics?	.717	.477	.081	na	na	na	.958	.049	.038
44: How was your learning outcome during the innovation camp concerning working in a cross disciplinary team?	.703	.411	-.251	na	na	na	.544	-.072	-.673
44: How was your learning outcome during the innovation camp concerning developing a network?	.522	.526	.091	na	na	na	.501	.798	-.058
49: How was it to work together with students from other educations and classes to solve an assigned task?	.810	.283	-.152	na	na	na	.985	.252	-.238

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.677 for all students, and 0.300 for the Facility Management students (Pattern matrix failed to converge). The Product Design students' correlation matrix was not positive definite when the dataset was split between the Facility Management and Product Design students.

So, what about the students' learning experience? Data from the 2011 innovation camp established three components, namely various aspects of creativity, networking and counselling. The Facility Management students' 2011 data did not converge with direct Oblimin rotation. The Product Design students' data established three components, namely various aspects of creativity, networking, and interdisciplinary work.

Table 7: The students' learning outcomes from the 2012 innovation camp (Varimax rotation, rotated component matrix)

Questions	All students			Facility Management students				Product Design Students			
	2	3	4	1	2	3	4	1	2	3	4
20: How large was your group's benefit from the mandatory supervision at the innovation camp?	-.099	.806	.243	-.046	.162	.109	.925	.461	.648	-.203	.264
32: How well during the innovation camp did you get to know the students in your group who were not your class mates?	.078	.127	.544	-.150	.153	.750	.336	.744	.110	.443	.251
42: How was your learning outcome during the innovation camp concerning the industrial partner and the service industry's challenges?	.818	.015	.242	.359	.736	-.237	-.176	.033	.348	.655	.345
42: How was your learning outcome during the innovation camp concerning your group's task?	.544	-.042	.066	.923	.180	.223	.013	.479	.011	.632	-.047
42: How was your learning outcome during the innovation camp concerning the need for gathering information in order to solve the group's task?	.712	.027	.416	.289	.819	.268	-.009	.227	.258	.820	.135
42: How was your learning outcome during the innovation camp concerning creativity and generation of ideas?	.609	.673	-.031	.786	.487	.125	.214	.045	.924	.207	.011
42: How was your learning outcome during the innovation camp concerning use of the supervisors as «sparring partners»?	.251	.729	.515	.285	.607	.013	.616	.280	.629	.005	.616
42: How was your learning outcome during the innovation camp concerning idea and concept development?	.591	.593	.049	.799	.397	.158	.184	.162	.779	.311	.125
42 How was your learning outcome during the innovation camp concerning problem solving when subject to time constraints?	.376	.266	.084	.881	.196	.315	.028	.818	.308	.235	-.024
42: How was your learning outcome during the innovation camp concerning sharpening of concept and message?	.673	.407	.179	.625	.500	-.338	.109	.562	.597	.378	.220
42: How was your learning outcome during the innovation camp concerning presentation technique?	.037	.469	.208	.239	-.216	.224	.765	.854	.358	.151	.167
42: How was your learning outcome during the innovation camp concerning group dynamics?	-.020	.087	.382	.361	-.047	.887	.019	.856	-.022	.077	.328
42: How was your learning outcome during the innovation camp concerning working in a cross disciplinary team?	.048	.293	.623	.378	-.009	.789	.123	.139	.206	.122	.853

42: How was your learning outcome during the innovation camp concerning developing a network	.328	.186	.717	.087	.791	.561	-.002.	.603	.214	.334	.526
47: How was it to work together with students from other educations and classes to solve an assigned task?	.413	.102	.742	.325	.863	-.104	.237	.293	-.106	.522	.608

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.784 for all students, and 552 for the Product Design students when the dataset was split between the Facility Management and Product Design students. The Facility Management students' correlation matrix was not positive definite when the dataset was split between the Facility Management and Product Design students.

The dataset from the 2012 innovation camp did not converge with direct Oblimin rotation, but Varimax rotation established four components, work process, task, creativity and interdisciplinary work. The Facility Management students' data also established four components, namely creativity, networking, group processes and counselling. Even the Product Design students' data established four components, networking, counselling, understanding the business, and cooperation in cross disciplinary teams.

Conclusion

The findings in this paper indicate that creativity can be taught and that innovation camps facilitate learning of creativity for Facility Management and Product Design students. But these students' learning experiences differ somewhat; most likely due to different emphasis in their educations. Facility Management students learned about creativity and creative processes, cross disciplinary teams and expanded their network. Product Design students in addition learned about cooperation and cross disciplinary teams, and also got a taste of some of the service industry's challenges. The exploratory factor analysis of the dataset in question thus indicates that innovation camps facilitate different learning for different categories of students. The students' learning outcome seems to be determined by the particular combination of tasks and student background.

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Steps to a Meaningful Learning of Commercial Law

Maria de la Sierra Flores & Miguel Diez de los Rios

Abstract

The teaching and learning model in the European Higher Education is focused on competencies. These consist of a combination of the attributes that qualify the theory learned by the student within the field of knowledge and the use of the theoretical concepts in the different case studies.

In the European knowledge society, the methodology followed in Corporate and Commercial Law subject has a deductive-inductive character. This methodology combines the theoretical speech of the teacher on common matters among the different European universities, with the students putting into practice the learned-cognitive structure to: real companies and hypothetical and practical Law cases.

The study of Law by means of the case method is useful in the education of students enrolled in other degrees and programs. With the devel-opment of the pieces of work, students of Economics, Business Studies or other degrees, learn the applicable legislation and the importance of regulation in their various fields of knowledge.

Keywords

Study of law; business studies; model from real companies

Student's knowledge and training compe-tencies in the meaningful learning of com-mercial law

Meaningfulness oriented teaching (Novak, 96) follows inductive-deductive methodology for acquiring knowledge within Commercial Law area. This area covers companies and their economic activity, this is, producing and distributing goods or services to the market: company, businessman and his stakeholders, types of businessman, Companies House, accounting, duties and contracts, insolvency, etc. Reflexive reading of the European legal framework concerning Commercial Law subject implies the following assumptions and requires the respective skill-based achievements: (i) theoretical learning approach by teacher's speech in the way of a traditional lecture, aimed at providing students with a common cognitive structure. This shared structure promotes the student to learn and comprehend; this means that the student identifies and is able to link the different institutions involved in Commercial Law subject (company, businessman, accounting, unfair competition, corporation, industrial property...); (ii) Practical teaching approach, in the way of the traditional case method (Minow 2), consists of legal knowledge use and application to certain situations. Examples could be case simulation (steps to follow for starting a

company), real exercises evaluation from the evaluation of forms used within corporate practice, problem investigation (evaluative analysis of administrative or legal decisions, etc). With all this knowledge, the student is able to modify, reorganize and relate the whole cognitive structure initially acquired (García García, 42). Thus, student's learning activity optimizes towards tasks that allow him to increase the theoretical knowledge, discover new knowledge, and integrate it with the already memorised and acquired information through teacher's lectures or reading.

Data from participants and subject

Commercial Law I (fourth year). Law Degree. Private Law module. Core subject, annual. 8 ECTS credits.

Participants are groups with an average of 150 students. From these, about 40%-45% choose the continuous assessment system, which is the topic of this study. These students already count on three years of legal education when they register for this subject (Commercial Law I). Pass as average record is required for being admitted in this degree, in any of the sessions that take place in June and September. Most of the registered students come from Spanish universities, and just few of them have previously studied at foreign universities part of Erasmus program. Stu-dents' average age is within 21 and 24 years.

Teaching planning and knowledge model normalization that students have to elaborate

Subject's program development

Development is done through a process that consists of 'didactic acts', whose different phases aim at qualifying students for learning and under-standing the Commercial Law knowledge area as well as providing them with a set of skills and abilities required for performing legal professions (lawyers, judge, professor, registrant).

Cognitive model is used for the main topics of the subject's program, which are explained in the room by the professor. This didactic mode is mainly followed during the first weeks of the course, so that methodology and knowledge about a specific legal institution, or about the overall discipline, is supplied in an organized way. Its main characteristic is the theoretical explanation of the content within the different program's les-sons: contextual frame of the analysis object (businessman, Trade Reg-ister, competition). Topic learning is combined with E-Mercantil technology, which has an 'instructional' (calendar and news forum) and 'com-municational' (e-mail, main forum) aim. Thus, the learning process is simplified.

Didactic-socioconstructive model focuses on the rest teaching activities which are carried out in a collaborative way and by means of the method case (knowledge of the company and its types by studying a company; problem solving by sentence or resolution analysis).

Theoretical-practical approach described above means that didactic activity for learning law matters has three focal points:

- Case study, preceded by the theoretical explanation of the lessons related to the contexts where the problem (or topic under study) arises
- Basic bibliography, either hard copy or multimedia
- Synchronization among all in-person and remote activities, individual or in groups. Organization and interaction among all aspects is programmed by the teacher and aim at making the student learn law matters by means of a transparent process that includes:
  - Theoretical knowledge of legal topics: registries, company shares, industrial property,...)
  - Competencies related with knowing how to use the learned concepts in real cases and situations that are simulated dur-ing the lecture
  - Abilities and skills needed within the professional world, acquired by the transmission of value as an integrating part of living in a social context (García, 2009:31).

In order to achieve these objectives, the following two issues play an im-portant role: presencial or on-line tutor sessions with the professor and accessibility through the web platform to the works made by the students (forums, corrected works,..)

Model type 'our Company' analysis

Moodle is the chosen platform to implement Commercial law subject after the pilot experience with a group from the combined Spanish-French de-gree. Among the cases essayed, the model type 'our company' can be found.

'Our business' model type has a group character and consists of studying legal topics from relevant information. This information is obtained by the student from the actual company web site following the advice of the teacher (basic and common for all students). Some of the national and foreign companies that have been analysed up to now are Agbar, Banco Santander, Caja de Madrid, Endesa, Casa del Libro, Galeries Lafayette, Samsung, Michelin, Iberia, Google or Vueling.

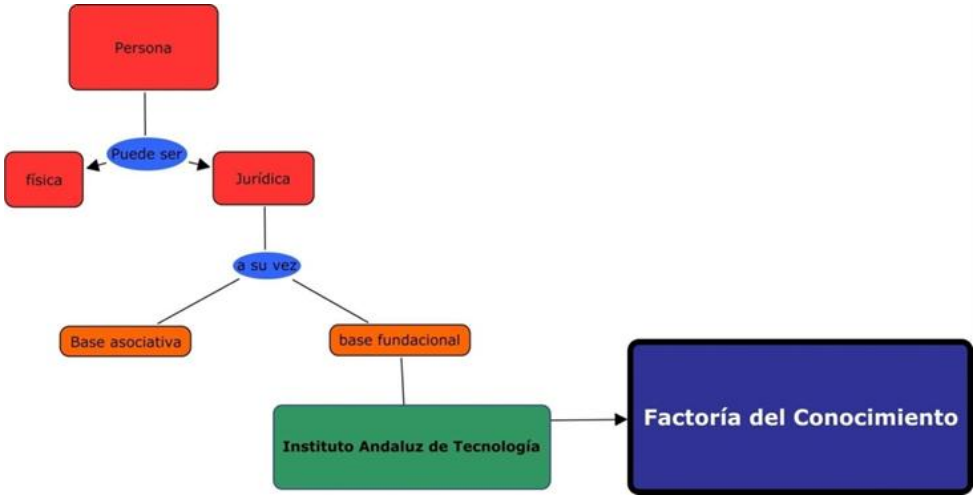
'Our company' case is very dynamic, as the student builds his own legal knowledge on the first legal concepts that are learned (business, publicity, registries) and applied to his company. The selected companies cor-respond to different kinds of businessmen and companies. Their nation-ality can be Spanish, French, English or any other. The economic sectors they belong to are different as well. The subject program contains the dif-ferent matters that help students to choose the companies they are going to work with.

Some of the already studied companies belong to the following groups:

- Food products sector: Danone, Mercadona, Bimbo.
- Financial sector (banks, stock market, insurance policies): Banco Santander, ING Direct, Caja de Madrid, Bankia, Mapfre)
- Infrastructure sector: Agbar, Endesa
- Transport sector: Air France, Iberia, Vueling
- Supply sector: El Corte Inglés, Galerías Lafayette, Mango, Zara
- IT sector: Samsung, Ericson, Google
- Tourism sector: NH, Hesperia, Sol Melia
- Knowledge sector (creation, management and exchange): Factoría del conocimiento

Each group of students has to compare their theoretical knowledge with the information contained on the company's website. By means of this methodology each group is able to define the common and specific features of their company compared to the rest. They can identify thus the type of business the company belongs to (Public Corporation, Limited Corporation, Foundation).

Figure 1: Conceptual map elaborated in order to represent the description of Foundation 'Factoría del Conocimiento'. It was made by student group number 3 from the combined Degree Spanish-French (year 2009-2010)



Besides, the students identify the useful sources to find the identifying features of their company.

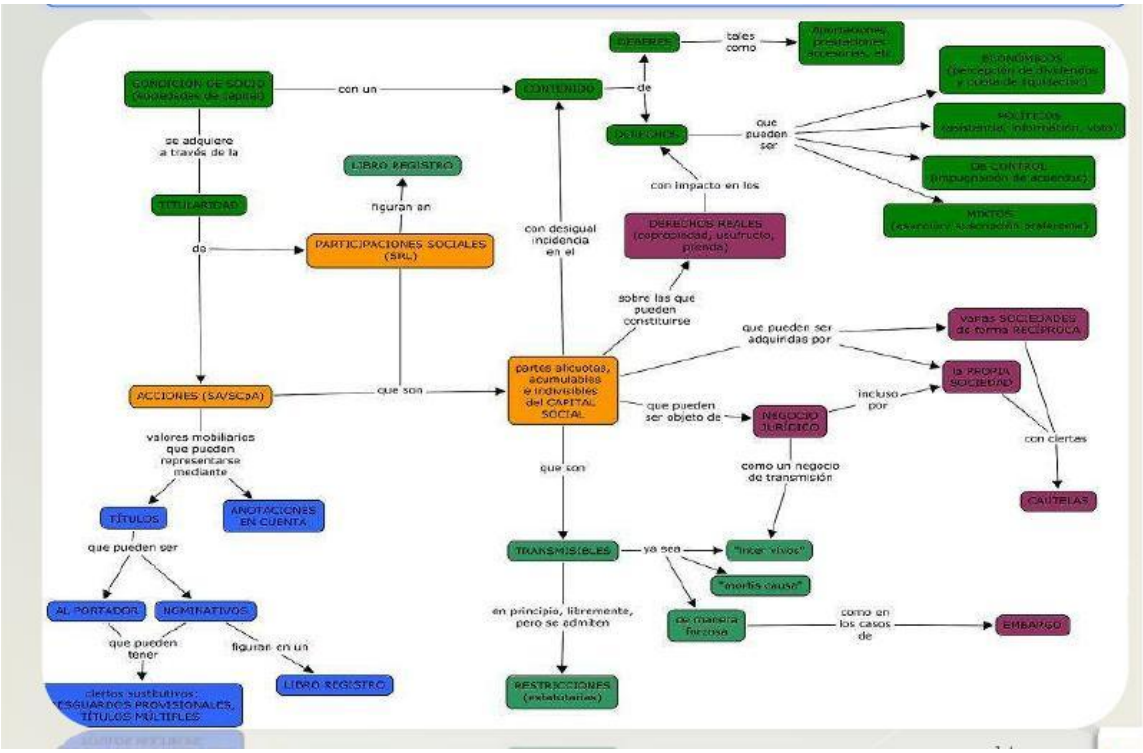
Figure 2: Comparative chart made for representing the legal description of the identifying features of the company (central column) and the useful sources (right column) obtained by searching through the website (left column). Company 'Sol Melia', fourth year of Law Degree.

Sol Meliá
FASE I HOTELS & RESORTS

INFORMACIÓN DE LA WEBSITE	DENOMINACIÓN LEGAL[1]	CONTENIDO DEL PRECEPTO
SOL MELIÁ S.A. http://es.solmelia.com/corporate/acerca-de-sol-melia.htm	DENOMINACIÓN SOCIAL: ✓ Conjunto de palabras con las que, con eficacia jurídica, se identifica, individualiza y designa a la persona jurídica titular de la empresa.	Artículo 6.2 LSC:[2] En la denominación de la sociedad anónima deberá figurar necesariamente la indicación "Sociedad Anónima" o su abreviatura "SA". Artículo 7 LSC: 1. Las sociedades de capital no podrán adoptar una denominación idéntica a la de cualquier otra sociedad preexistente. 2. Reglamentariamente, podrán establecerse ulteriores requisitos para la composición de la denominación social.
ACTIVIDAD: "Sol Meliá es la compañía hotelera vacacional más grande del mundo, además de líder absoluto del mercado español, tanto en el ámbito de ocio como en el de negocio." OBJETO DE LA SOCIEDAD ...actividades relacionadas con el turismo, el ocio y el esparcimiento y recreo..." ✓ Se concreta en los ESTATUTOS SOCIALES DE LA COMPAÑÍA http://inversores.solmelia.com/view_object.html?obj=116,135,140,c,269	ACTIVIDAD: ✓ El empresario lleva a cabo una labor de producción o distribución de bienes, o bien de prestación de servicios al mercado. OBJETO SOCIAL: Enunciación clara y completa de las actividades principales que lo integran	Artículo 1 CCom[3]. Son comerciantes para los efectos de este Código: 1º) Los que, teniendo capacidad legal para ejercer el comercio, se dedican a él habitualmente. 2º) Las compañías mercantiles o industriales que se constituyeren con arreglo a este Código. Artículo 3 CC[4] 1. Las normas se interpretarán según... la realidad social del tiempo en que han de ser aplicadas. ARTÍCULO 117. RRM. [5] 1. El objeto social se hará constar en los estatutos determinando las actividades que lo integren. 2. No podrán incluirse en el objeto social los actos jurídicos necesarios para la realización o desarrollo de las actividades indicadas en él. 3. En ningún caso podrá incluirse como parte del objeto social la realización de cualesquiera otras actividades de lícito comercio ni emplearse expresiones genéricas de análogo significado

Students learn to use the theoretical lesson regarding partners and shares transmission.

Figure 3: Slide from the annual report presentation of Sol Melia Company. This work has been done by a group of four students from fourth year of Law degree



Learning general procedure and flow

The procedure is unique and the same for all the different models that have been tested. The general learning scheme takes place in five phases. In each of them, students receive the information about the case study or the norm to be analysed in this activity, and develop this information by applying the preestablished model for each activity. The required information has been previously published on the "News and teacher's announcements". The same method is followed for the students to spread the tasks they have done using the 'forum', 'database' and 'glossary'. The general activity flow is the following:

First phase: professor's lecture. With regards to 'Our Company' case, the lesson given by the teacher shall deal with the concept of business and businessman. Also businessman's types should be explained: physical person, legal entity, public corporation, limited partnership, etc. Students' participation and motivation should be encouraged by asking brief questions related to the case, company or activity under study. At the end of this phase, students acquire not only cognitive general structure, common to all matters related to their cases, but also a small sample of the task they have to carry out.

Second phase: study and use the knowledge with the case study. In order to facilitate students to achieve this, they are explained through the "News and teacher's announcements" forum about the relevant information to be obtained from the company's website.

Third phase: interaction and communication among students through the 'Main course forum', regarded as a 'Socialization space' (López Alonso, 110).

Each student has to prepare a message where the initial case study's result are communicated, and send this message to the 'Main Forum'. The content of this message should: (i) follow the order of the questions, (ii) be organised according to the preestablished common structure, (iii) use a precise legal language. The reference

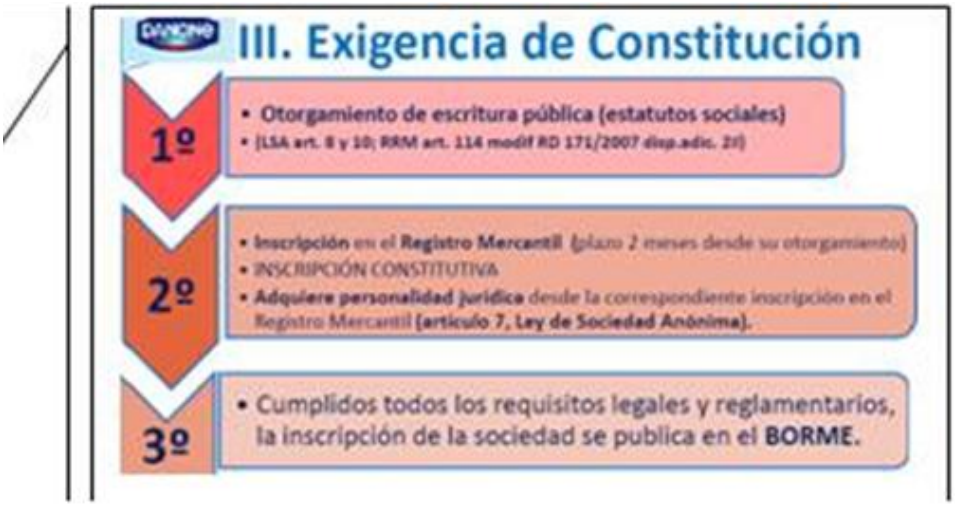
documentation has been previously provided either attached to the message (in case of legal sentence) or by the company website link. In this phase the different cases are normalized and the learning process becomes transparent.

Even though each company has different characteristics, they are made comparable and equivalent by standardising students' works in form and in content. Thus, some advantages can be obtained: Facilitate the communication of learned knowledge, and simplify the transmission of learned knowledge by using a preestablished model.

On the other hand, publishing all messages on the forum makes the acquired knowledge by each student visible while favour the interaction among students, as all of them have access to the messages created by the rest. Besides, reading the other students' messages makes students verify, modify strength and improve the quality of their knowledge.

Fourth phase: Presentation and oral defence of the results. The presentation is made according to two preestablished models for the case studies and using PowerPoint or a similar program. Students need to adequate their contents to a normalized model (number of slides, agenda, minimum content that has to be included in each slide). There is freedom nevertheless for deciding each slide's design.

Figure 4: Slide included within 'Danone' presentation



Each group member has to present the part he/she is responsible for. The final presentation corrected by the teacher is finally introduced as part of the final work prepared by the group.

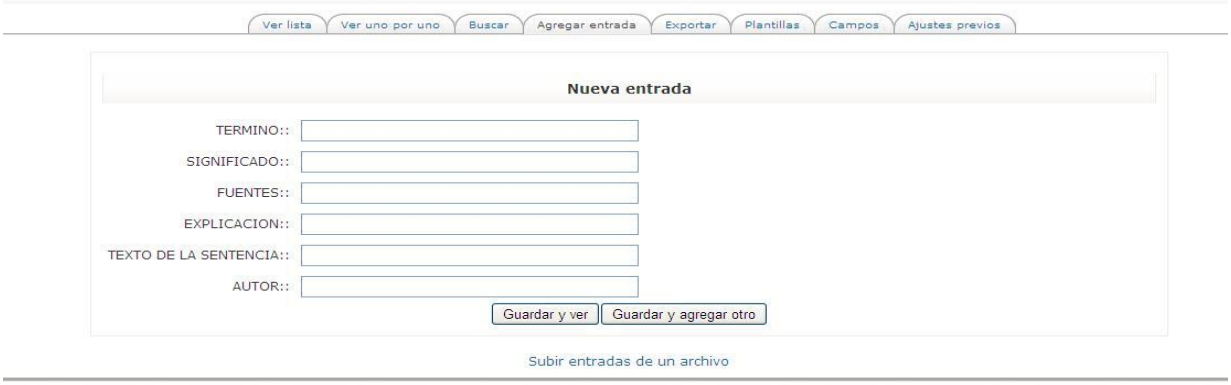
By the end of fourth phase, students already count on organized information about the matters that their work deals with. Therefore, students have acquired the ability to reorganize, consolidate and resize the whole cognitive structure regarding legal concepts affected by the activity. Concerning the example that is being analysed, these concepts are: type of business, activity sector, commercial publicity, Trade Register. Students learn also how to communicate and share their knowledge, following a common structured scheme for all students. As a result, they could proceed with elaborating a term related to the company.

Fifth phase: The creation of a term that is related to the studied and analysed company and legal sentence has to be carried out to fit in the database created by the teacher for each activity. Therefore, the following components were constructed on the computer academic platform:

- Database macrostructure organized in two levels, which are related between them and with a unique entry through the 'Glosario' tool.

- Database's microstructure is created according to a common template which includes also many special templates that were needed while studying the subject.
- All database fields have to be fulfilled by students following common instructions.

Figure 5: Screenshot from 'Database' application as it is seen by students. It represents a legal sentence case study.



After evaluating the works, the best ones are published on 'Evaluated works'. Therefore, each time the term is found on the E-Mercantil web space, students can directly connect to the legal information elaborated by other students.

Conclusions

On-line campuses have multiplied learning scenarios and they now play a key role for synchronizing knowledge with pedagogic resources and activities. Open spaces within on-line campus make the structure easier and allow the automatic management of the whole learning system. Thus, teachers are able to design their own models concerning constructive knowledge while they follow a common structure, which has been developed using different tools available on the academic platform (database, forum, glossary). By using these tools, students can produce their own knowledge regardless of whether the content is different or not to that of the other students.

This common model developed during six academic years with students from Law Degree (fourth and fifth year), and combined French-Spanish Degree (second year), confirms:

- Standardised models promote the construction of legal knowledge learnt by students. This knowledge is homogeneous and comparable among all students, despite the content diversity and the different results achieved in the case study analysis done by each student, either individually or in group.
- Continuous communication among students using forums and other pedagogic scenarios (blackboard, lectures, debates guided by the teacher, etc) speed up the time needed for assimilating and comprehending legal matters.
- Learning process can be observed by the teacher, so he/she can improve or reorient students' work during the academic year
- Resources management simplifies and speeds up the way teachers perform the follow up, monitoring, and evaluation of students.
- Students' results and achievements are optimized if the teacher publishes the best works on the main Glossary or in any other application available at the academic platform that is being used.

The above introduced methodology's synthetic development makes evident that E-Mercantil course entails a knowledge model of constructive character, preferably sociocollaborative. The explained methodology is coherent with the excellence academic model required for the legal education at the European Space of Advanced Education, as well as it is non dependent on the technological platform used.

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Creativity within the Higher Education System

An Analysis of the New Higher Education Professionals

Sarah A. Ooro

Abstract

Higher education is hardly a static sector of the society. An example that is rather evident is illustrated in the way universities have been forced to transform themselves in light of a world that is continuously facing the challenges of globalisation and internationalisation. Previously considered ivory towers, sheltered from the influences and distractions of society, existing within a semi-sanitised environment that was ideal for conducting research and that would primarily be of use to the society. Generally, they seemed to have disconnected to the society at large, they were elitist (although some have intentionally retained this characteristic) in nature however as time went by they realised they would not compete effectively within the self imposed walls. These same walls have traditionally defined the roles of those employed within these institutions into two main categories: academic and administrative with the former perceived to have a more prominent role and status and the latter labelled support staff. The waves of change are however transforming the higher education and more specifically the university scene quite drastically leading to the carving up of a new group of professionals who fall into what is referred to as the third space. The third space describes the New Higher Education Professionals (NHEP) who could theoretically perform any of the roles represented by the two categories but are also ideally prepared from an academic point of view to perform functions that were previously non-existent within the university job profile. This paper seeks to examine this phenomenon which may be highly developed in the western world although also still quite recent. In the developing world this is a concept that is in its very early stages of conception and perhaps not well understood. The idea of what constitutes a third space professional and the challenges that come with the territory as well as their perception by their more conventional colleagues are aspects that will be tackled within the scope of this paper. It is important to point out that this thematic area is of personal interest to the author because she falls in the category of NHEP and comes from a country that is hardly conversant with the concept. The author comes from a developing country and works for the countrys only accreditation agency and while this falls outside of the university environment there is nonetheless contact with universities and the programmes they develop at least within the context of private universities. Considering the fact that this phenomenon is at its embryonic stage in developing countries and specifically Kenya the author has decided to analyse the evolution of the third space in the United Kingdom with the aim of identifying the lessons that can be learnt through the successes, challenges and the ongoing developments within this field. It is hoped that at the end of this paper there will be a better understanding of what is meant by the whole idea of third space professionals. Whether their definition as professionals is justified or perhaps a mere re-definition of conventional terminologies.

Introduction

Higher education is hardly a static sector of the society. An example that is rather evident is illustrated in the way universities have been forced to transform themselves in light of a world that is continuously facing the challenges of globalisation and internationalisation. Previously considered ivory towers, sheltered from the influences and distractions of society, existing within a semi-sanitised environment that was ideal for conducting research and that would primarily be of use to the society. Generally, they seemed to have disconnected with the society at large and were elitist in nature (although some have intentionally retained this characteristic) however, as time went by they realised they would not compete effectively within their self imposed walls. These same walls have traditionally defined the roles of those employed within these institutions into two main categories: academic and administrative with the former perceived to have a more prominent role and status and the latter labelled support staff. The waves of change are however transforming the higher education realm and more specifically the university scene quite drastically leading to the carving up of a new group of professionals who fall into what is referred to as the third space. The third space describes the New Higher Education Professionals (NHEPs) who could theoretically perform any of the roles represented by the two categories but are also ideally prepared from an academic point of view to perform functions that were previously non-existent within the university job profile.

This paper seeks to examine this phenomenon which may be highly developed in the western world although also still quite recent. In the developing world this is a concept that is in its very early stages of conception and perhaps not well understood. The idea of what constitutes a third space professional and the challenges that come with the territory as well as the perception held by their more conventional colleagues are aspects that will be tackled within the scope of this paper. It is important to point out that this thematic area is of personal interest to the author because she falls in the category of NHEP and comes from a country that is hardly conversant with the concept. The author comes from a developing country and works for the country's only accreditation agency and while this falls outside of the direct university environment there is nonetheless contact with universities and the programmes they develop at least within the context of private universities. Considering the fact that this phenomenon is at its embryonic stage in developing countries and specifically Kenya the author has decided to analyse the evolution of the third space in the United Kingdom with the aim of identifying the lessons that can be learnt through the successes, challenges and the ongoing developments within this field. It is hoped that at the end of this paper there will be a better understanding of what is meant by the whole idea of third space professionals. Whether their definition as professionals is justified or perhaps a refined re-definition of the more conventional administrators will be analysed. One would not be wrong to state that their definition as third space professionals obviously presupposes that the academics and administrators are the first and second spaces. Additionally, the numerical attachment could suggest to some, the level of importance of the professions and it could also point to the continuing evolution within the higher education field which everyone engaged within the university world has the responsibility of not only accepting but also understanding.

In discussing this issue the term higher education will be used in particular areas as representing post secondary education while university will be used as one of the typologies exhibited within higher education. The terms are therefore not used interchangeably. The discussion will begin by detailing the changes within higher education as a whole and how these have evolved to include among other issues that of third space which is of interest to the author. Thereafter, there will be a discussion on what the aspect of third space constitutes and how this is transforming the university landscape. A primary question the author will seek to answer is whether this phenomenon is resulting in a human resource management challenge. While the topic is quite interesting it is also quite new and not highly researched implying a limited number of scholarly articles. Herein lies not only the challenge but also the intrigue of further exploring this area and in whatever minute way creating awareness and a better understanding of this phenomenon.

The Trend within the Domain of Higher Education

According to Teichler (2007) the term higher education gained popularity towards the end of the twentieth century as a depiction of, "the intellectually most demanding stage of pre-career education" (Teichler, 2007, p.11). Universities on the other may have slight variations in the definition depending on the national context being considered. Within Europe they are defined as, "multidisciplinary institutions in charge of both teaching and research, entitled to award advanced academic degrees (notably the doctorate) and, where applicable, entitled to award subsequent degrees qualifying for senior academic positions (the "doctor scientiae" or the Habilitation), are considered the key institutions of higher education" (Teichler, 2007, p.15). Higher education exhibited in its current form with its well known functions of teaching, learning and research is largely believed to have originated from the European universities that existed in the Middle Ages. The establishment of the first modern university in Bologna at the end of the 11th Century provided a foundational model of what a university constituted but over time this model exhibited specific attributes depending on the national context within which it existed. During the 1800s the British model emphasised more on the development of personality and mental capacity through a strengthening of the contact between teachers and students. The French model on the other hand was evidenced by the delineation of faculties which had an intellectual and cultural emphasis and those that had a professional approach. The German model was Humboldtian in nature with the emphasis being the state guaranteed institutional autonomy and academic freedom. This academic freedom extended to student thus providing them with the opportunity for independent learning and at the same time underscoring the importance of contact with the professor. This type of university not only combined teaching and research but gave the university the opportunity of serving the society. The U.S model was on the other hand a blend of the British and German models with the former being adopted at the undergraduate level and the latter being adopted in the so called graduate schools. The Humboldtian model gained popularity in the 19th Century while the concept of graduate schools with a combined research and teaching approach became popular a century later (Teichler, 2007, pp.11-12). A number of elements are quite striking from the onset, first is the fact that there is no element of staticity within the field of higher education and second is that the field of higher education is quite disaggregated and while there are similarities in aspects such as students, teachers, the related activities of teaching and learning there are specificities with respect to the model a particular country adopts. Thirdly is the aspect of interconnectivity with regard to the fact that higher education systems have the ability of demonstrating seamless qualities in the sense that they can adopt attributes from other systems when suitable.

This evolution has continued to date into what Teichler (2007) states as being referred to as the third stage in the history of higher education (HE). This stage which emerged after the end of the Second World War transformed higher education into a service that was available to the masses and not just, "a small number of academics and socially exclusive professions" (Teichler, 2007, p.12). In most industrial countries, less that 5% of a respective age cohort was enrolled in a HE institution around 1950, this percentage rose more than 10 times towards the year 2000 (Teichler, 2007, p.12). This explosion in growth was not only in terms of a particular age cohort but was also in absolute terms and included students from both middle and low income backgrounds. This created reforms in the secondary school as well as the university systems primarily in the form of expansion of elite institutions and creation of new ones which operated alongside them. These changes were fuelled by a number of factors such as: the new wave of democratisation; the need for employees with competencies to fill white collar jobs within the public sector; the prevailing conviction that economic development would be further fuelled by an educated workforce; the appeal that this level of education carried and a host of other reasons (Gibbons, 1998, p.11). Clark (1995) in an article he wrote way back in 1995 stated that HE was entering a phase which he described as being experimental. He further elaborates on this fact by stating that in just about every European country at that time there was more than one university, "...engaged in a

major reorientation that breaks away from a traditional mould or offers an important evolutionary adaptation of an older form."(Clark, 1995, p.7). An important characteristic that signifies this evolutionary era is the emphasis on innovation which will boost an institution's capacity to engage in high level research and training that can best be described as being world class. A capacity which he states exists in both developed and developing societies (Clark, 1995, p. 7). This situation has been created and stimulated by the phenomenon of globalisation which has led to what some have described as a move towards convergence of HE systems and increased competition between institutions within these systems (Teichler, 2007, p. 18). The fact these developments are still ongoing and perhaps even intensifying one may consider the phenomenon of globalisation as signifying the beginning of a fourth stage in the development of higher education. A stage where we see not just massification, but globalisation determining how systems behave. An understanding of what globalisation and its sister concept internationalisation are important in setting the stage for the discussion of the internal changes that are ongoing within universities. After all one expects that internal environments are undergoing transformation just as the external ones are.

Globalisation and Internationalisation

Globalisation has been simply described by some authors as being the current way of life. From a sociological point of view it is perceived as the flow of both people and services locally and globally in such a way that there is a transcending of the time and space continuum. It has been stated that there is the creation of a new economy through the co-existence of, "the new social forms of time and space, 'space of flows' and 'timeless time' ....with traditional forms of space and time" (Eggins, 2003, p. 1). It has been argued by authors that the phenomenon of globalisation can be identified through the observation of two characteristics: "the introduction of the market, and the withdrawal of the state." (Eggins, 2003, p. 2). Becher and Trowler (2001) state that the term globalisation is contested in terms of the existence of a unanimous definition that is embraced by all, additionally concepts such as economic and virtual globalisation which contain different intrinsic meanings have also come into existence. The authors however chose to define it as, "the global flows of information and resources along networks transcending nation-states' influence and disturbing nationally organized systems and practices. Such networks intimately connect the local and the global and may have any combination of physical, social and economic characteristics" (Becher and Trowler, 2001, p.2). The consequences that a globalised setting has on HE are enormous, essentially because it is creating new structures, opportunities, challenges, threats and novel models of offering incentives and disincentives. This has resulted to four concrete consequences that the authors outline as being:

- Limited financial support from the state due to the increase international competition
- The increasing importance of techno-science to HE due to its importance in accessing international markets
- The strengthening of the relationships between governments and multi-nationals with the aim of enhancing their innovative capacity as well as product development and
- Amplification of the interest in global intellectual property strategies in developed countries and multi-national companies thus creating an avenue for research by universities.

This phenomenon has not only led to convergence between HE systems of certain countries such as the UK and USA it has also blurred the margins between public and private sectors of HE and led to the prominence of applied science in the universities. Also quite striking is the fact that HE has attained a borderless element due to the expansion in the marketing for new students. This has led to the emergence of the concept of global mammoth universities which have transformed the way teaching and learning is conducted through the use of the so called knowledge media (Becher and Trowler, 2001, p. 3).

Scott (1998) states quite clearly that while not all universities may be considered international all are affected by the process of globalisation in a

certain capacity and level as either objects, subjects, agents or victims of these processes(Scott, 1998, p.122). De Wit (2008) gives an account of a number of definitions including one by Albach whom he notes describes it as, "specific policies and programs undertaken by governments, academic systems and institutions, and even individual departments to support student or faculty exchanges, encourage collaborative research overseas, set up joint teaching programs in other countries or a myriad of initiatives" (de Wit, 2008, p.5). He supplements this definition with one from Teichler which states that it is, "the totality of substantial changes in the context and inner life of higher education relative to an increasing frequency of border-crossing activities amidst a persistence of national systems, even though some sign of 'denationalisation' might be observed" (de Wit, 2008, p.5). A further definition which is proposed by Knight states that it is, "the process of integrating an international, intercultural, or global dimension into the purpose, functions or delivery of post-secondary education" (de Wit, 2008, p.7). It can be argued that internationalisation is a response of HE systems to the phenomenon of globalisation. Universities and the entire HE landscape have been compelled to evolve in order to become relevant. It is inconceivable that this type of changes have not caused these institutions to transform irrespective of their resistance. The prevailing issue becomes one not just of survival but of relevance beyond one's national boundaries. Relevance that that is expected to foster the building of new networks that will generate an increase in income that these institutions direly need. This aspect will be further analysed in discussed further in analysing Michael Gibbons work in analysing the dynamics of this change. The subsequent section will attempt to argue out how these developments have generated a new class of professional or job profiles within the universities.

The Internal Roles of University Staff

Lohmann (2002) states that the university was created not only to answer the difficult questions that existed within its environment but it was an optimal organisation that addressed, "problems of specialization and protection. Its structures enable a deep specialization and protect scholars from each other and the outside world." (Lohmann, 2002, p.7). In describing how difficult it is for the university internal management to change, Lohmann uses the standard cliché comparing, "managing academics to herding cats, changing the curriculum, to moving a cemetery." (Lohmann, 2002, p.3). In an analysis of the defence mechanisms and defects existing within the university she argues that the, "the structures of the university that enable knowledge production are necessarily prone to ossification. What makes the university strong is precisely what makes it weak." (Lohmann, 2002, pp. 5-6). In elaborating further on this point using the analogy of defects and defences from the Darwinian medicinal principle Lohmann (2002) states that a broken leg falls into the category of a defect, it would be prudent to have it checked out because there is the likelihood that one could make good use of it someday. A fever though is a defensive mechanism and while it may have harmful effects such as damaging body tissues, creating discomfort or even lead to death in extreme cases. It also has positive attributes such as acting as a red light, warning the patient not to exert undue stress on the body, keeping harmful pathogens under control and sustaining a patient. This same analogy can be transferred to the university in the sense that one has to differentiate between a defect and a defensive mechanism. It is in understanding the differences that one will come up with an appropriate mode of action. The realisation that defects need to be eliminated while defences though having mortal attributes are an outcome of their interaction with an environment that is quite severe is critical at the very least. The role played by the latter needs to be recognised first and foremost in order to realise that their eradication will be costly. She classifies the rigid borders that demarcate disciplines and security of tenure as types of defences (Lohmann, 2002, p.6).

Change is nonetheless inevitable and Whitchurch (2004) states that the roles and characteristics of administrative managers in the UK have changed due to the institutional responses to the adjustments in the HE environment (Whitchurch, 2004, p. 280). In order to effectively analyse this change it is important to analyse the world of the academic and the characteristics that are

attributed to this group of people after which there will be a similar analysis of a similar but perhaps less appreciated group within the university circles that of the administrators.

The Conventional World of Academics

Elton (1996) reiterates the common description of academics being, "the last remaining cottage industry" (Elton, 1996, p. 138) as being quite representative when it comes to task differentiation they are well known for assigning different levels of prestige to different tasks. Research is placed much higher than teaching and even within research the pure form is regarded much highly than the applied form of research. In the same breadth teaching is also categorised with lecturing being placed much higher than tutoring and laboratory work. The conventional order of academia has also been referred to as old collegiality which has the following characteristics:

- The old collegiality includes only academic staff to the extent that their contribution is of higher value
- They have intellectual loyalties to their disciplines since they consider themselves primarily as researchers consequently the institution plays a secondary role
- They have a preset way of undertaking their research, teaching and administrative roles
- Academic staff usually work as lone rangers and only become involved in team work if there is no choice
- By and large they are primarily trained as researchers and not teachers, administrators or managers and
- Academics are a source of frustration to the support staff in the higher echelons because they are considered as not contributing enough to the management of the institution while support staff in the lower cadres considers their role as that of offering service to the academics.

In his analysis, Elton (1996) states that this form of collegiality as well as the hierarchical management of universities will not be apt in steering universities through the turbulent times (Elton, 1996, p. 140)

In her analysis Lohmann (2002) states that universities have an in built tendency towards ossification because of their need to ensure the propagation of specialisation and protection. While knowledge does not stagnate, areas that were of interest today wither away to make room for new areas. Specialised academics and discipline specific departments however resist any attempt at change, this situation is a result of certain aspects. One being the fact that they are tenured which is intended to serve the purpose of allowing the academic to explore the world of knowledge in whatever form he sees fit, not be intimidated by those wielding power and undertake research that may be considered risky but could bring forth yields. This arises from the fact that the academic has allegiance to the peer group that influenced his socialisation in graduate school where the environment and all that appertains to learning moulds the student into a scholar. This same peer group will be responsible not only be responsible for writing referred reports to the articles that the 'new' scholar writes but will play a role in the attainment of tenure. Changing tracks mid-way will be costly not only because the scholar will be compelled to re-invent but also because the peer group support will suddenly disappear. This is too costly considering the fact that the student has attended graduate school where he/she is shaped into what she refers to as a, "Fachidiot, that is an expert who has a very particular way of viewing the world." (Lohmann, 2002, pp. 15-16). One can observe from this explanation how the academics have more allegiance to their discipline, a point that is stated by Elton, (1996). Additionally, one can also see how and why they focus more on research than any of their other roles. If one is to consider the idea of Fachidiot it would simply imply that there is a replication process that takes place within the various disciplines in order to ensure the survival of the discipline. In other words the academics appear to be ready to advance ossification because the risk of fossilisation of a particular discipline is far too great. It is therefore no wonder that those appearing to destabilise this sheltered world of the discipline specific academic is held with a great deal of contempt. This contempt is generously showed on administrators.

The Conventional World of Administrators

Whitchurch (2008) states that there is a negativity associated with the terms administration and management. This is due to a number of factors, one of them being the inadequacy of the terms in fully capturing the activities conducted by the professional staff who undertake them. The second reason is connected to academic staff who contest, "administration for its association with unwanted bureaucracy, and management for its association with what is perceived as an erosion of academic autonomy." (Whitchurch, 2008, p. 379). Referring to them as administrative managers in an article she previously wrote in 2004, Whitchurch (2004) quotes Gibbons who states that this category of professionals, "...underpin the governance of academic activity. They have been in the front line in dealing with the pressures of mass higher education, new forms of knowledge, market competition for resources, and the communications and information revolution." (Whitchurch, 2004, p. 280). This group of staff hold no academic posts and undertake functions which include, "student services, finance, human resources, estates, enterprise and external relations." (Whitchurch, 2004, p. 280). In their performance of these duties, they either fall into the category of generalists or specialists the defining criterion being whether they possess professional qualification in the area of their job function (specialists). The former category typically refers to those who have no specialist training in the area of their job function but have gathered experience in this area through working for a number of years in an analogous sector. Over the years specialists have increased in number and generalists have been confined to areas such as: registry and the performance of secretariat roles. They can also be found performing tasks in areas concerned with quality and 'widening participation' (Whitchurch, 2004, p. 285).

Although specialists (those with formal training) can be considered to be taking over, it is not uncommon to find those who learn their trade on the job still performing tasks in the mainstream positions (not secretariat or registry). There is however a new wave blowing and it is becoming increasingly difficult to define who an administrator is especially because of the use of both administrator and manager interchangeably. Previously the term administrator espoused the philosophy and ideals of public service, but currently is associated with clerical or secretarial tasks. Those performing tasks such as faculty registrar are now considered to be performing managerial tasks and are referred to as business managers. It may be quite arguable whether the change of name actually corresponds to a change or expansion of the tasks performed. Whatever the disputes concerning the terminology there is generally agreement that they fall within the umbrella term of professional services additionally, there is a growing awareness of the service functions to the institutions. Functions such as student recruitment and the role that physical facilities (which were always in the shadows), play in this regard. On a one on one basis there exists a partnership between academics and administrators/management however as collective units there are deep fissures between the two groups. This is especially so when the latter are linked to the execution of government policies which have metamorphosised into the creation of the creation of roles related with quality assessment/auditing which are also costly. Furthermore there has been a separation of academic and managerial tasks with those in management noticeable experiencing an increment in power and influence. This is especially irking to academics who want to run their own affairs but are inefficient managers, in spite of this they decline to accord others the opportunity to manage. It seems to be a tight balance for administrators who are either classified as submissive clerks when they perform service tasks or exerting immense power when they voice their opinion in policy decisions. This is not the only challenge, they are either considered to be betraying their administrative colleagues when they support policies that are academic friendly or highly corporately inclined when they prioritise ideas that academics may consider managerial in nature (Whitchurch, 2004, pp. 283-285). This may be the case because they possess academic qualifications such masters or PhDs and in some cases even a research background which allows them to ascend to an academic management position. The functions they undertake are also partially academic and finally, they are engaged in teamwork that

requires a great deal of knowledge on institutional policy areas as well as within specialist and academic realms (Whitchurch, 2008, 279). In spite of this developments, Whitchurch (2008) laments that there is no research that has been devoted to this category of staff and the related transformation that has been ongoing particularly with regard to their role expansion (Whitchurch, 2008, p. 380).

It is quite clear that the internal environment has not been left untouched by the changes occasioned by globalisation and internationalisation. The academics have had to deal with the reality of role differentiation and the equally important roles their colleagues within the university environment are playing. The comfort taken within the discipline or the professional group still exists and will continue to persist but the weight of this allegiance in light of the new reality may soon be challenged. The fact that little research has been done on the role of administrators/managers is symbolic of how lowly they have been perceived particularly by their colleagues in academia. This is changing dramatically and administrative managers are acquiring academic qualifications in their area of that allow them to move higher in management posts and enable them perform tasks that have academic and administrative elements. They can no longer be referred to as paper pushers, the role they play has become extremely essential and strategic as they participate in steering the universities through these tumultuous waters. These waters are facilitating the creation of new avenues, avenues that are causing a shift in structural positioning but also in how knowledge is viewed.

Gibbons Theory on a New Mode of Knowledge Production

Gibbons states that there are changes taking place within the realm of knowledge production. Activities that were previously thought to be the sole preserve of institutions such as, "knowledge production and dissemination – research and teaching –" (Gibbons, 2008, p. i) are now undertaken outside of the conventional institutional precinct. There are a variety of new knowledge producers on board and Information Communication and Technology (ICT) is availing a myriad of opportunities for further exploration. There is a narrowing of the gap between what can be considered emerging knowledge producers, universities and industry. This is critical because, "Over 90% of the knowledge produced globally is not produced where its use is required." (Gibbons, 2008, p. i). While universities can be considered to boast a highly esteemed position in the whole scheme of knowledge production through the roles they play in both national and regional development, the influence they have on civic mores and the facilitation of lifelong learning they are no longer unchallenged. In order for them to survive they will have to engage in partnerships which will involve both competitive and collaborative elements (Gibbons, 2008, p. ii).

The elements that are going to be critical for higher education in the 21st century are: accountability and relevance that is demonstrated, in the sense that its outcomes are clearly visible. Change cannot be considered as a one of event within an environment that is dynamic. Rather it involves piecemeal adaptations to the ongoing changes in the surroundings. Within the university environment this relevance will have to be translated into objectives that will clearly be visible through heightened quality in teaching and intensified research. Gibbons (2008) states that the research structures and practices that found residence within the confines of universities worked towards cementing the importance of coming up with results that were scientifically sound. The knowledge generated within this framework had the characteristics of not only having a disciplinary structure but also adding to this specialised pool of knowledge. This in turn forms the basis for curriculum that is taught at the undergraduate level. At the same time those working within this specialist field continue to conduct research thus ensuring there are new ideas, methodologies and practices flowing thus ensuring a level of dynamism not only within the discipline but also in the curriculum. This type of knowledge is Mode 1 in nature. Considering the fact that Mode 1 type of knowledge is produced within the discipline it prescribes, the structure of the research, the scholars responsible for undertaking it and the outcomes valuable to the field (Gibbons, 2008, pp. 2-4). In essence, "the disciplinary structure defines both what shall count as "good science" and prescribes, as well,

what students need to know if they intend to become scientists." (Gibbons, 2008, p. 4).

A new form of knowledge has however emerged, one which is not conventional, one which does not fall within the definition of scientific according to the precepts of Mode 1, after all anything which does not adhere by the rules of is not scientific. This mode of knowledge is described as Mode 2 and those working within this field are referred to as practitioners/researchers, not because they are unscientific in their methodology but only because this is a distinctive term. Its piercing differences from Mode 1 stem from the fact that: Mode 2 knowledge is generated within an application context; is transdisciplinary in nature; is heterogeneous in nature and organisationally diverse; the level of social accountability is enhanced and finally the system of quality control is more broadly based (Gibbons, 2008, pp. 5-6). An elaboration of these aspects is necessary in order to conceptualise the difference. Knowledge produced within the context of application primarily has to be useful to the parties involved either government, industry or the society at large. Since there are a number of stakeholders involved there is always an ongoing process of negotiation and all the interests of the stakeholders have to be met before this knowledge is produced. This introduces the aspect of demand and supply with both those involved in the supply and those making the demands being diverse in terms of composition. Disciplinary wise one could mention aeronautical engineering or computer science which are new forms of knowledge that were previously nonexistent in universities but were produced within an application context. Transdisciplinary here does not just refer to an assorted range of specialists working together within an intricate applications centred setting. Rather it requires a distinctive but evolving structure that takes into consideration existing theoretical knowledge while allowing for creativity. It also contributes to knowledge but not necessarily the discipline because it develops its own norms, structures and methodologies. Furthermore, the channels of communication are partially informal and formal. The information is not diffused through institutional conduits but rather to those who participated in the research. There is a distinct dynamism with reference to the problem solving capacity, those involved are highly mobile seeking problem contexts as avenues of knowledge generation. As much as the researchers mobility may be high they build persistent communication networks that are worthwhile in the future (Gibbons, 2008, pp. 6-7).

The heterogeneous and organisational diversity aspect refers not only to the fact that the team brings in a diverse set of skills from a wide range of experienced people but also the knowledge is not produced within universities but alternate sites such as research centres, think tanks, consultancies and so forth. There is also intensification of communication through informal but functioning structures e.g. electronically. The knowledge generated is not flowing to the discipline but serving the wider society because fields of study combine and reconfigure with the sole purpose of creating useful new knowledge. The social accountability characteristic on the other hand emanates from the fact that there has been increasing interest from the general public on issues related with the environment, reproduction, privacy rights that have stimulated a whole new awareness into the impact that science and technology can have on resolving some of these issues. Since the nature of the problems involved are highly intricate and multi-dimensional a whole range of scientists from a wide range of disciplines are working alongside each other to come up with solutions. The composition of stakeholders not only includes scientists but also lobbyists who push for representation in agenda setting. Finally, the quality control aspect is exemplified in the fact that those selected to act as peers are chosen based on their competence in performing this task and partly on their prior input into their discipline (Gibbons, 2008, pp. 8-9).

This section is important in exemplifying the reality that has been conceived by globalisation and how it has necessitated certain actions which inevitably have an impact on higher education institutions. The so called Fachidiot who is symbolic of Mode 1 is not necessarily devalued he is however forced to re-invent himself in order to thrive within the seamless world of Mode 2 knowledge production. The Mode 2 type of knowledge cannot be simply wished away and no matter how hard the disciplinary gatekeepers

persist in upholding Mode 1 as true science, the outcomes of Mode two are quite visible and have had an influence in the creating of third space professionals.

Third Space Professionals

In Whitchurch's (2008) study on the existence of this category of professionals in the UK, she states firmly in the introduction that the idea of third space denotes a territory that is emerging and is colonised principally by professions that are not bound by either academic or professional realms. She predicts that the phenomenon of third space may indicate, "future trends in professional identities, which may increasingly coalesce with those of academic colleagues who undertake project-and management-oriented roles, so that new forms of that space professionals are likely to emerge" (Whitchurch, 2008, p. 377). Who exactly are third space professionals and how are they emerging? Traditionally, there has been a binary division with respect to role definition in higher education institutions. The academic sphere and the administrative/management sphere with the latter considered to be performing a supportive role to the former. Prior to 1992, the academics performed management roles on a rotational basis. These roles which included deanship or heading a department were also undertaken on a part-time basis. Academics either decided to focus on either teaching or research, while some multi-task undertaking both. There was yet another set of academics who decided to be academic managers which obviously had its repercussions. The so called support staff are further sub-divided into either specialists or generalists. Most common though is the is language used for instance, " 'academic' and 'non-academic' staff, and 'us' and 'them' attitudes" (Whitchurch, 2008, p. 378).

According to the study there seems to be a blurring of borders between professional and academic activities and external and internal environments leading to broadened projects such as community partnership and areas such as transition of students. These broad projects require the contribution of a wide array of expertise from both realms (Whitchurch, 2008, p. 378). In her classification of staff she interviewed, she discovered that the categories they fit into was determined by how they dealt with the structures and borders they came across. Consequently, she identifies three types of professionals:

- Those who position themselves within the organisational or functional enclaves either willingly or by imposition and ascribe to the sustenance of procedures and standards and prescribed tasks are described as bounded professionals.
- Those who acknowledge the existence of borders but use them to construct strategic and institutional leverage especially because they are knowledgeable about the territory across the border. They tend to be skilled negotiators and politically adept and interrelate with the external surroundings. They are described as cross boundary professionals.
- The third category refers to those who ignore borders and focus on extensive linkages across the institution such as expanding participation and on the general development of their institutions. They have an external network which they draw on and their professional prospects fall within HE or outside the sector. They are classified as unbounded and are typically involved in, "institutional research and development" (Whitchurch, 2008, p. 383).

The bounded professionals possess specialised expertise that that is geared towards the production of knowledge that is standardised through processes that are preset. The latter two categories apply their knowledge within a project environment that is transitory and spatial in nature. There is a complexity associated with the tasks they undertake as well as the liberty of working as an individual. It is quite important to note that as much as the cross-boundary and unbounded professionals seem to be operating on the periphery of academic environs they originate from mainstream academia. Aside for the three classified categories, she discovered through her study that there was new group referred to as the blended professionals because they, "worked in such areas as regional partnership, learning support, outreach and

offshore provision, and were likely to have mixed backgrounds and portfolios, as well as external experience in a contiguous environment such as regional development or the charitable sector." (Whitchurch, 2008, p. 384). The cross boundary, unbounded and blended professionals can be considered to reflect the element of being borderless. However those who most embody third space are blended and unbounded professionals because the cross boundary counterparts flow in and out of this space continuously. One can also deduce that the individuals entering this third space do so at different points in their career and depending on the prevailing circumstances. When describing third space elements such as temporal projects (either long or short term), blended teams which may be geographical or virtual and networks. The third space has emerged not because boundaries exists rather it seems to exist irrespective of them. An important aspect to those operating within this area was the need to understand the current developments within third space in order to ensure the new forms of knowledge were integrated and institutionalised. This could only be achieved through developing a language their bounded colleagues understood and translating the outcomes of the knowledge developed thus necessitating a continuous in and outflow across the boundaries which some are involved in resulting in a new collegiality (Whitchurch, 2008, pp. 384-387).

This idea of new collegiality while also mentioned by Elton (1996) as being important and inevitable is not easy because as he suggests the importance of retaining the value of objective enquiry cannot be overemphasised while at the same time there is need for a transformation in the attitudes and practices of academia. The two aspects are widely different from each other he denotes and the idea of a new collegiality requires an element of belief in the unknown away from the comforts of traditional collegiality. Changes especially if initiated from the top with regard to initiatives such as research institutes and contracts for researchers result in the creation of a climate of tension and resentment in the academic world making it difficult to foster trust that is essential for building the new collegiality. It is important to note that there is need for developing a balance because change does not come easy (Elton, 1996, pp. 140-142).

This of course re-enforces the obvious individual and institutional implications of third space professionals. The individual implications according to the study include the fact that the there is minimal individual authority that one brings along into a project (lateral relationships emphasised), the unwritten contract seems to be based on the ability one has in problem solving such that a brilliant problem solver will increase their chances of being involved in other projects. Within an institution individuals increase their chances by: building networks with influential people, attaining relevant academic qualifications, creating environments where they can experiment, optimising ambiguity to the advantage in the sense that they do not affiliate themselves with specific organisations and being able to deal with the possibility of uncompleted projects. While lateral relationships were emphasised through the study on third space Whitchurch (2008) discovered that the respondents noted that problems arose within project groups when the individual team members had varying levels of seniority (Whitchurch, 2008, p. 387-389).

Institutionally speaking it is indisputable that the bounded approach to knowledge is essential in preserving and enhancing the processes of standardisation and regulatory systems that are the bedrock of organisational permanence. On the other hand it is not possible to ignore the developments that are taken place and that are representative of the third space. It is therefore imperative for institutions to develop a balance that involves engaging a healthy number of professionals from the third space who will prove useful in providing the necessary fuel need to achieve the mission and objectives of the institution. There may be challenges in mainstreaming the borderless professions depending on the institutional type. It was also quite clear from the study that those who fell within the older age group were more likely to be found within the bounded group then their younger counterparts. A number of respondents revealed frustration at feeling confined within their roles and these fell within the bounded group. It was quite clear that institutions were keen on recruiting individuals who had third space qualifications, that is, professionals who had experience in sectors that were outside of university framework such as fundraising since

they felt that they would be quite advantageous to them. It was also revealed that while these professionals were quite influential in reconciling and building networks between the borders there was still need to overcome the hurdle of disloyalty that some associated with colleagues who operated in this field because they represented professionals whose loyalty was not attached to a single institution because of their level of mobility. There are challenges of not only acceptance but of developing an employment framework that allows institutions the leisure of customising employment structures (Whitchurch, 2008, p. 389-392).

Third space is an evolving realm that in my opinion does not signify an end to the knowledge produced within the disciplines nor does its existence intend to diminish the importance of this type of knowledge. It is all a question of relevance in a world that is seeking faster, applicable solutions to problems that are too complex to be solved by one discipline. Those operating within the borderless realm, particularly the blended and unbounded professionals and to an extent the cross-boundary fall within the category of Mode 2 operatives. The transdisciplinary aspect, working in project teams, the complicated social context and so forth all suggest this. Examples can be obtained from everyday life, the recent oil spill off the coast of the US was a crisis that required the involvement of more than just the oil companies involved, the engineers working at the rig or the government policy advisers. The marine biologists, local and international lobby groups, computer experts who simulate probable measure of fixing the oil leak and a whole range of other experts were involved in dealing with the immediate and subsequent problems. One can also make mention of the recent atom bomb catastrophe in Fukushima, Japan, the problem was not just local, team of scientists and disaster management experts from the developed world are involved in handling the matter. After all this is not only a learning experience for them because they also develop similar energy sources but it's the inevitable of globalisation. The recent E-Coli bacteria outbreak in Germany in particular required scientists to act immediately in developing a drug that would help fight the outbreak. A problem suddenly erupts and they have to try and understand a strain of bacteria they are not familiar with, the knowledge developed here is for application purposes. Aside from this, since there were a number of European countries linked and due to globalisation (flights in and out of countries) it is quite imaginable that scientists from different countries are working together. It involves more than doctors treating patients directly, research teams in institutes, government experts, agricultural experts, farmers are all directly involved not to mention citizens themselves who require information. The people working in these project teams get together to solve a problem (or at least attempt to solve it) and once their mandate is over they recede back into their enclaves or the next project. This has implications for higher education because if they are not adept at making themselves relevant they will very slowly fossilise. On a more upbeat note, one can state that the existence of cross boundary professionals who move back and forth from the bounded area into the third space indicate that there is an exchange of information and that the era of fossilization for universities is far from here. Although managing academics may be akin to herding cats and changing curriculum to moving a cemetery getting a number of pipers who play the right tunes and involve the traditional collegiality in the process may soon have the cats moving without unleashing their claws.

Conclusion

This thematic area is important to me not only because it is an area that is quite visible but perhaps not well understood and perhaps even under researched. Secondly, because I would classify myself as a third space professional. First, because I have undertaking an International master degree in higher education research and development an unconventional graduate programme. This is an area that is rather new and has been developed because of research undertaken concerning the changes within the field of higher education. The knowledge developed here can be stated by some to be contributing to the bounded broad disciplinary area of social science. Although my undergraduate degree is also from social science my major was government and public administration or what some scholars would refer to as political science which adds a degree

of diversity. Although it could be argued that my graduate school is training me to be a Fachidiot, this argument could also be contradicted by the fact that my masters programme is housed within an institute International Centre for Higher Education and Research (INCHER) that undertakes third space activities such as student transition, internationalisation and a whole number of collaborative projects. The fact that it is a specialised institute within the university illustrates a third space element namely, the creation of space where one can undertake specialised research outside of normal organisational structures. Coming from a developing country the international networks that I have made and continue to make through this opportunity have definitely led to my involvement in collaborative projects of a third space nature. The Organisation for Higher Education, Cooperation Research and Development (OCIDES) is one such initiative that brings together higher education researchers from diverse countries and facilitates information exchange and knowledge creation. The German Academic Exchange Service (DAAD) who sponsored my studies in Germany also provides a myriad of programmes through which third space have the possibility of thriving. I work for a higher education body that facilitates the professional development of its staff by availing study leave opportunities, sabbaticals and related developmental programmes. This structural ingredient promotes exposure to new modes of knowledge creation and application which could feed back into the organisation when (or if) the employees return.

The aim of this paper was to explore the world of third space through the eyes of those involved and mainly academics and administrators and to show the myriad of challenges affecting these various categories of staff as they deal with this new phenomenon. Although there is not a great deal of literature in this area, this paper has endeavoured to show that there are changes and challenges within the traditional categories of university staff and there is a domino effect occasioned by globalisation and internationalisation that has led to the creation of the third space. While the research was based primarily on developments in the UK with contributions from authors who mentioned case studies in the USA it must be noted that there is convergence in the developments within the two systems outlined in this paper. Moreover as has been mentioned, through the process of globalisation, the world is indeed a global village and higher education institutions operating in developing countries are not unaffected by these developments. It may be quite surprising for some to discover that they are heavily involved in third space activities especially if one considers the dynamics of brain drain. Through involvement in third space activities immigrant professionals working in developed countries have the possibility of exploiting the opportunities they have through third space initiatives to contribute to the development of their native countries. In order for third space initiatives to be successful there is need for institutions to set up human resource structures that will facilitate the creation of a thriving environment not only for third space but all categories within the higher education system. This is indeed a monumental task that presents challenges because of the dynamism involved and the fact that adaptation is a process in and by itself it is however not impossible.

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About the Authors

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Track 2: How to teach creativity

In the modern ways of competence development learning takes place in various forms. Teaching does not constitute just a teacher's monologue anymore but often consists of numerous creative activities. But how do we use creative techniques and learning environments to teach our students? This track concentrates on the delivery of curriculum, learning and teaching environments, methods and models that have the aim to teach in a creative fashion.

In search of creativity measurement tools, based on the example of an educational process

Beata Dratwinska Kania

Abstract

The aims of this paper are:

- the identification of the criteria (critical points) of the creativity measurement in the educational process. This is connected with identification and the intensification of the individual sources of creativity and their shift on the most suitable for them methods of the teaching and learning,
- examining the dependence between the students results and preferences relating to the methods of the teaching / learning. The methods of induction and deduction are used in the paper.

Keywords

Creativity measurement

Introduction

Creativity defined as a creative attitude, the process of forming new ideas, concepts, associations as well as the ability to create something new, the ability to notice various aspects of a problem, positive motivations and the ability to seek alternative solutions and ideas, "technical gifts" for using metaphors, analogues of associations etc., the ability to find defects in what is as well as to question ready solutions and truths. The adjective "creative" has positive connotations, in most of the cases. A creative person is one who is fluent in her/his profession, qualifications, intelligence, has ideas and does not act in conventional manner.

The notion of "creativity" or "creative" can be understood variously depending on the accompanying noun. We can for example speak of creative thinking, creative acting, creative work, creative ideas, creative accounting (only the latter one thanks to media is not associated positively). Majority of definitions of creativity implies the connection of creativity with the formulation of a new socially accepted value that may be defined in very different ways. This value may include for example: developing new methods of treatment, deepening the knowledge of the universe, creating a new, better political system or goods redistribution system, discovering new technologies that may be used for the benefit of humankind, beauty or even finding more effective methods of wealth increasing.

The most obvious dependencies between the creativity and the formation of a value include the process of expanding the recipient's knowledge of the reality he/she gets acquainted with, in other words giving a new value to the hitherto knowledge. In this sense the creativity

can be understood as the ability to create new socially valuable information. Thus if we understand information as a sequence of received signals, the creativity will stand for giving new meaning to the hitherto signals.

Therefore, firstly it should be observed that we need creativity and that it is associated with the creation of information. Along with the economic growth the intensification of procedures connected with the development of the economy based on knowledge that is to be characterized by the increase of innovativeness and creativeness takes place. These processes translate themselves also into the educational field. Creativity is possible in every discipline and should be promoted throughout the whole of education. Being creative is not only a matter of inspiration. It requires:

- professional 'knowledge' - means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual;
- professional 'skills' - means the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments);
- 'competence'- means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development.

Therefore, it can be said that people need help to be creative or people need help to be more creative and creativity can be developed. For this purpose, however, a proper education process is needed.

They are the aims of the investigation:

- the identification of the criteria (critical points) of the creativity measurement in the educational process. This is connected with identification and the intensification of the individual sources of creativity and their shift on the most suitable for them methods of the teaching and learning,
- examining the dependence between the students' results and preferences relating to the methods of the teaching / learning.

The methods of induction and deduction are used in the paper. The theses will be evidenced using a theoretical study.

Literature review

Authoress did not meet with investigations on this subject. It made used in the article publications of the classics authors of the economy.

In search of creativity sources

Creative learning and creative teaching are processes aimed at wealth and prosperity but taking advantage of the flaws of human nature and „inclination to the evil". There are unusual phenomena when something which is considered ethically wrong – such vices as laziness, envy, greed etc. – is exploited usefully. The source of creativity, then, is the dark side of human nature. In the fable of the bees Mandeville proves that quite a good and effective social system can be built on vices. Although it is commonly thought that a devil hides behind emotions, Mandeville maintains that they are nothing bad if they are used for public good. Thus wealth and public well-being may exist only when less creditable inclinations of human nature rise to speak. In his footnotes to the fable of the bees Mandeville says: "If you want to make a gathering of people strong and powerful you have to stir their emotions. Divide the land and no matter how much of land there would be to spare the ownership will make them greedy. Snap them out of inactivity by means of praises and even jokes and their pride will compel them to work for good. Teach them trade and crafts and you will elicit envy and competition. To increase their

headcount establish various workshops and leave no piece of land without cultivation. Let the property by protected sacredly and let the privileges be equal for everyone (…). Moreover, if you want to make a rich, educated and well-bred nation from them, teach them trade with foreign countries and, if possible, get behind the sea". This concept may also be referred to the educational process that when enriched with creativity should bring an added value. Therefore, if passions and emotions underlie the sources of creativity they should be properly stimulated to achieve an adequate effect e.g. by the actions such as:

- introducing awards for the best, e.g. scholarships, awards, practices and trainships,
- organizing contests and tournaments stimulating competition for best positions,
- praising and highlighting best achievements,
- enabling and promoting foreign contacts,
- selecting a grade scale according to the diversity of a given society and not according to a universal norm set in advance,
- a good information system about success of students and graduates,
- organizing meeting with the most eminent graduates.

Therefore, all undertakings strengthening competition will also increase the effectiveness of the educational process. Whereas, if this potential is not used it will result in the detriment of the effectiveness of every action as well as the educational process. In the fable about the bees when the bees decided to seek morality and virtue they lost also the useful lust for material goods – the vice that in their social interest was an advantage and lost their home. Mandeville writes: "However, when you want to have a thrifty and honest society, the best way to achieve that is to keep them in natural simplicity. Do not try to increase their headcount; do not let them meet people from other countries or objects of luxury, eliminate and conceal everything that could incite their desires or deepen their knowledge."

However, it should be taken into consideration that for the creativity to present a positive value, creativity needs to be kept within certain limits, which are established on the basis of ethical criteria. If creativity crosses these limits, it starts to destroy the value, instead of creating it. Strengthening desire, pride, greediness, envy or completion itself can bring disastrous results which we experience in the form of e.g. an economic crisis.

The success of bees results from the fact that they managed to devote themselves and their work to a joint undertaking. If everyone of them wanted to work to have their own home and increase its wealth, the stock of bees would die. Translating the above statement into the educational process it should be noticed that we will not achieve a success without strengthening socially positive attitudes such as: honesty, reliability, truthfulness, promoting a responsible and caring approach among leaders and punishing so-called shortcuts to achieve an effect. A proper attitude in the education process will strengthen positive occupational models and behaviours which adds value to enterprises and societies.

About creativity measurement

The question: whether the process creativity is measurable? is a question of the same kind as: whether a value is measurable? In case of the notion of a value not only there is no consent as regards its measurement but also as regards the definition of value itself. No consent within these aspects does not prevent others from creating newer, "better" - in the opinion of authors, tools for value measurement. The definition of the notion of creativity does not stir particularly stormy disputes. However instead of the question: whether creativity is measurable? (somebody could say: who will forbid us?) I would ask:

- to what extend would the information about process effectiveness decrease the uncertainty as regards the effectiveness of these processes?
- is creativity worth measuring and what to do with the potential results of such measurement?

- what value would we achieve as a result of creativity measurement by various methods?
- which creativity measurement method is most appropriate?

The reply to the above questions depends on the certainty degree of creativity measurement results as it determines their later usability and the possibility of use in management. It is also related with the choice of a measurement method. Assuming positively that creativity measurement makes sense we can at least indicate the following methods of creativity measurement on the example of the educational process:

1. measurement methods based on creativity sources, its effects (increased value) or creativity of implemented processes. The measurement of the creativity of the educational process should be based on effects, and not on the identification of the source factors which can cause the success (from the teacher or student side), because the creativity itself, which is not under control, can ruin us. On the other hand, the good use of own imperfections can be the source of general benefit. Therefore, if we control these imperfections, they are not bad at all. Recognition of the 'dark side of human nature' as a source of creativity is a turning point for valuation,
2. subject-oriented measurement methods: institutional creativity, creativity of a person informing and supervising the educational process – a teacher, creativity of the recipient of the educational process – a student,
3. measurement methods adopted to the creativity type of the educational process and thus also to:

- regressive educational process based on solutions from the past which are expected to revive creativity,
- adaptive educational process which shall improve the current tools in order to intensify creativity,
- innovative educational process which should find solutions enabling the development and use of creativity potential. The innovative type of educational creativity process is connected with the creation and demolition illustrated with mythological tales and legends about the Hindu Shiva God. All the three creativity types adjusted to a type of educational process are observed in both teaching and learning parties.

In order to measure the results of the educational process, as well as its creativity, one should take into account both a teaching process and learning process, as the educational process takes place in between these two phenomena. It would be a mistake to focus on the teaching process, ignoring, at the same time, the learning process. According to J. Dewey: "Teaching and learning are correlative or corresponding processes, as much so as selling and buying. One might as well say he has sold when no one has bought, as to say that he has taught, when no one has learned".

For example, when we want to measure the creativity of educational process, the following facts should be taken into consideration:

- a teacher can show a very big creativity during running the classes, but cannot require that creativity from students. The students will not learn creatively; they will get to know the facts. Teacher's creative potential will not be used for creative learning,
- a teacher may require a very high creativity from students when - for some reasons - he cannot use his own creativity – he does not have motivation, has personal problems etc. Such attitude, in a long period of time, causes resistance and rebellion. Students' creative potential will be wasted,
- a teacher may teach creatively and require creativity from students (acceptable division of creative effort put in educational process). This situation is potentially the most beneficial.

If we assume that creativity arises as a result of the information exchange taking place within the framework of the educational process, all aspects

of the process should be evaluated and on the other hand a proper creativity profile characterizing all aspects of the educational process should be selected. When selecting a proper creativity profile characterizing all aspects of the educational process a group should undergo testing to identify sources of creativity and preferences related to the affecting tools used. The use of improper tools in creating creativity despite the efforts put into the educational process will not conduce to the improvement of the effectiveness of the educational process.

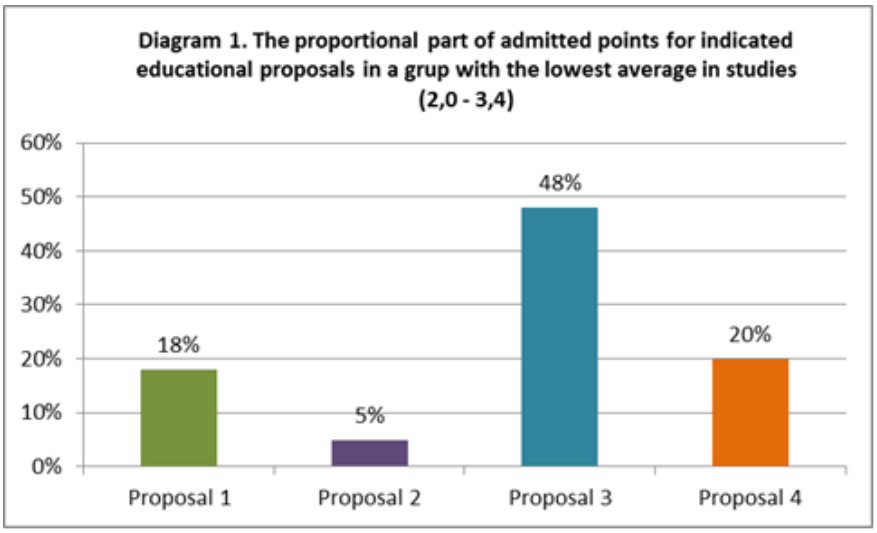
To evaluate the dependencies of educational process results in the form of an average from the studies and the preferences of students as regards the tools inciting the mobilization to learn tests were carried out in the group of 1000 students of the University of Economics. The following educational propositions related to the 3-grade scale of their evaluation was presented to the group undergoing the test:

1. Creating conditions for various forms of studying at a given university, in the form of traditional lectures and exercises with a lecturer, multimedia courses, preparing independent projects of research as well as the variety of subjects at one's individual choice, special interest groups, contests, lectures conducted by invited guests, the possibility to the international exchange of students etc.
2. Giving new problems to find solutions to by oneself related to seeking the literature of the object, independent work with a book and control of tasks performed during didactic classes for example in the form of a talk.
3. Requiring an innovatory use of already known tools (discussed by a lecturer) in the form of a complex case study as the form of a team work, brainstorming etc.
4. Requiring an educational problem accurately and interestingly presented in theory and practice and then the control of its performance in the form of verified acquired knowledge and skills.

The results of investigations

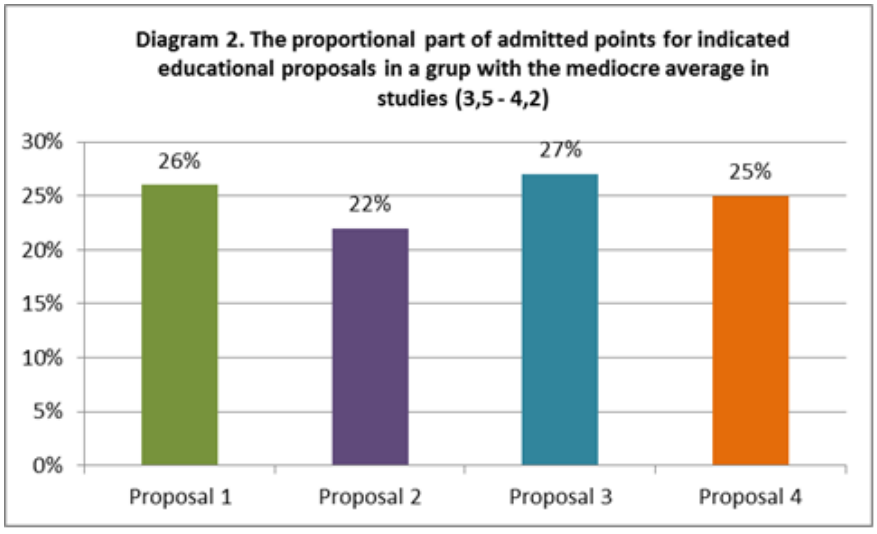
On the grounds of the tests it was concluded that the majority of persons in a group with the lowest average in studies (2.0-3.4) prefers classes in the form of team work and brainstorming, whereas does not appreciate classes in which a teacher mobilizes students to work by themselves on the grounds of studies of the subject literature and controls their performance. Such students most frequently have mediocre opinion about their chance to improve own activity on the grounds of the proposition of their university and about the traditional way of conducting classes in the form of theoretical lectures, practical classes and the control of performance. Rather a large number of replies negating all educational propositions given by students who appreciate none of the suggested forms of activities was noticed in this group. This group was excluded from the test results on the grounds of their extremely biased replies. The results are presented in diagram 1.

Diagram 1: The proportional part of admitted points for indicated educational proposals in a group with the lowest average in studies (2,0 – 3,4)



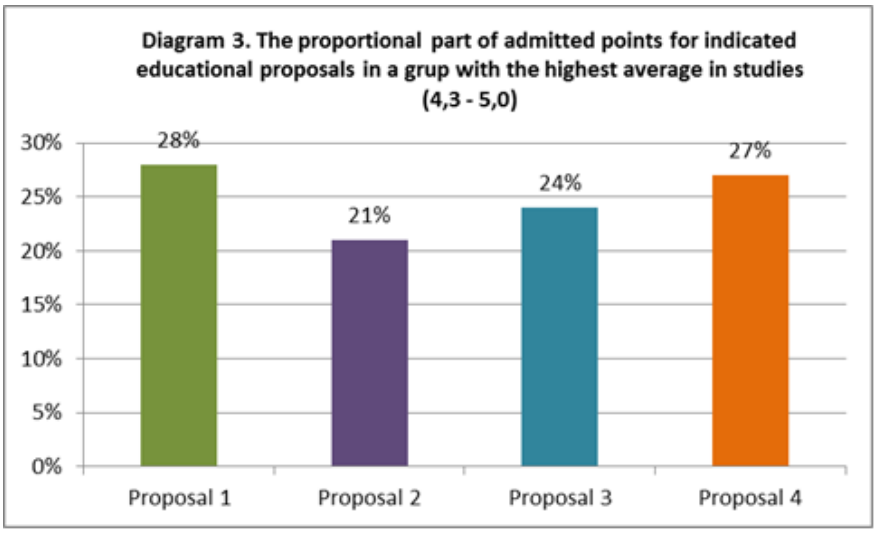
In the group of students whose average in studies was mediocre (3.5 – 4.2) a large variety of preferences was observed without visibly dominating preferences as regards available forms of studies. This group did not include persons negating all propositions, however, neither could there been observed a decisive majority that would opt for any of the one propositions. The results are presented in diagram 2.

Diagram 2: The proportional part of admitted points for indicated educational proposals in a group with the mediocre average in studies (3,5 – 4,2)



In the group of persons having the highest average in studies (4.3-5.0) a majority of the subject gave the highest score to all educational propositions. This group did not include persons negating all propositions, however, neither could there been observed a decisive majority that would opt for any of the one proposition. The results are presented in diagram 3.

Diagram 3: The proportional part of admitted points for indicated educational proposals in a group with the highest average in studies (4,3 – 5,0)



Conclusions

Improving creativity is most difficult in the group of students with the lowest average in studies. In such case work should start from increasing enthusiasm and emotions among students as well as their openness to propositions.

Improving creativity is difficult in a diverse group of students due to their individual preferences. Furthermore, it can be concluded in such case that classes individually selected by students within the framework of available curriculum propositions are a better solution compared to regular groups of students learning according to a strictly defined course of studies. A possibility of an individual choice of the course (diverse education offer) is conducive to the formation of homogenous groups of students in terms of preferences related to the way of releasing own creativity. Whereas the release of own creativity is a factor that strengthens educational effects.

Moreover, it can be also concluded that creativity measurement will not give significant results among:

- groups of students with non-homogenous preferences assigned to regular educational groups and studying according to an imposed, strictly defined list of subjects,
- students with poor effects of studies in the form of a low average in studies.

The led correctly educational process should take into account the measurement of the creativity of the processes which should be used in the management the educational entity. The measurement of the creativity of the educational process overthrows for on:

- the opinion of educational process in the scale of the institution,
- the individual Workers' opinion,
- they delivering source information for students and workers about this, what individual factors help them in the realization of the aim the most intensely (they are liberate the creativity in workings), and also how to use these factors in the future.

However, for creativity measurement to give valuable results, firstly, the educational system in use should be developed according to the prerequisites allowing to release creativity effectively.

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Developing Creativity and Innovation through Collaborative Projects

Antonio Fernández Morales & María Cruz Mayorga Toledano

Abstract

The aim of this paper is to explore the potential role that collaborative projects can play in the development of creativity and innovation in higher education, looking for appropriate and efficient designs to enable students to develop the forms of creativity that are most suitable for their study and professional careers; and to illustrate it with the experience we are carrying out at the University of Málaga in the degree of Actuarial Science.

Keywords

Collaborative projects, creativity, problem-based learning

Introduction

It can be argued that the main purpose of higher education is to help students develop their potential as completely as possible at this level. From this perspective, enabling students to be creative should be an indissoluble part of this mission, which could be a useful and enriching element of their experience at the University.

In addition, since higher education institutions are preparing students for an uncertain and even more complex world of work, to accomplish in their professional careers, they will be required to use not only their analytical and practical capacities, but also, and more intensely, their creativity (Jackson, 2006).

On the other hand, many authors consider that the potential for creativity is heightened in group-learning situations, where students bring different perspectives to bear on a particular task, and the sharing of ideas and the collective effort may encourage individual initiatives.

From this perspective, introducing collaborative projects in the curriculum may constitute a good opportunity to support the creative side in the learning and teaching process.

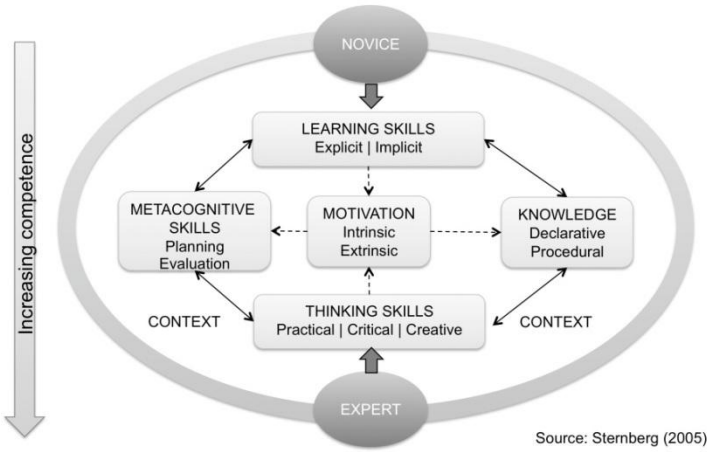
In this paper, we explore the potential role that collaborative projects can play in the development of creativity and innovation in higher education, looking for appropriate and efficient designs to enable students to develop the forms of creativity that are most suitable for their study and professional careers. This approach is illustrated with the experience we are carrying out at the University of Málaga in the degree of Actuarial Science.

Methodology

It is important to see creativity not as a standalone competency, but in the perspective of a complex set of abilities and capacities, which should be developed in the tertiary education stage. The model of Sternberg (2005), which shows how abilities can develop into competencies, and competencies into expertise

(Fig. 1), is a good example of the complicated interactions that occur in the process of competencies development. In this model, creativity is located in the stage of developing thinking skills. As Novak and Cañas (2008) state, learning can vary from highly rote to highly meaningful, but creativity results from very high levels of meaningful learning. There are three main kinds of thinking skills (or performance components) that individuals need to master in Sternberg's model. Critical (analytical) thinking skills include analyzing, critiquing, judging, evaluating, comparing and contrasting, and assessing. Practical thinking skills include applying, using, utilizing, and practicing. Creative thinking skills include creating, discovering, inventing, imagining, supposing, and hypothesizing (Sternberg, 2005). These ones are very similar to those earlier mentioned by Sternberg and Lubart (1995), for whom, in a broad sense, creative skills include to imagine, explore, synthesise, connect, discover, invent and adapt.

Figure 1: Development of abilities into competencies and competencies into expertise.



But, in addition, creativity manifestations may be very different in every field or domain, from History to Law, from Engineering to Biology, etc. That is the reason for investigating the meanings of creativity in these diverse contexts and to encourage educators to develop the forms of creativity that are most appropriate for their field(s) of study and future careers (Jackson and Shaw 2006).

Focusing on the learning and teaching process in the higher education context, we can identify the core characteristics of creativity, following the EUA Creativity Project Report (EUA, 2007):

- Originality: creativity is not about reproduction, but entails new developments (which albeit may build on established knowledge) and requires a certain disrespect for established ideas and concepts as well as personal courage.
- Appropriateness: not every novelty is creative, but creativity manifests itself in new approaches that are appropriate to the problem at hand.
- Future orientation: that is, not looking backwards, but being concerned with what may happen in the future and dealing with the resulting insecurity and uncertainty.
- Problem-solving ability: the capability to identify new solutions to problems; this requires "thinking outside the box", looking at things from a new angle, venturing off the beaten path and risking failure.

Closely related to the first point, Clegg (2008) states that 'a critical assault on confining ideas, structures and even modes of 'being' is

fundamental to creativity. Creative and critical faculties are intimately linked'.

Notwithstanding the importance of the introduction of mechanisms to promote creativity and innovation in current higher education curricula, it should not be considered in isolation. Encouraging creativity and innovation is intimately linked with other strategies and priorities like widening participation, first-year experience, retention, entrepreneurship and personal development (Working Group on Creativity and Innovation, 2007).

Although complex learning and problem working are ordinary activities in higher education that could be considered ideal conditions for developing creativity, we are often loosing opportunities to encourage creative and innovative outcomes and teaching and learning processes. There are several difficulties and barriers we find in the current higher education scene, which are summarized, in the following points:

1. Even though it is assumed that analytic thinking governs the academic intellectual field, academic and scientific research is often viewed more as an objective systematic activity than as 'a creative activity that combines, in imaginative ways, objective and more intuitive forms of thinking' (Jackson 2006).
2. Designing courses and teaching processes allows a significant degree of creativity, but there is little public acknowledgment of good or excellent creative practices in this area. In addition, creative aspects of teaching are often implicit and difficult to value or recognize.
3. Even when creativity is expected from students, it is not often explicitly included in the assessment process. The most frequent schemes establish the expected learning outcomes and rarely allow unexpected or student-driven results. Thus, we may find a scenario where 'creativity as an outcome of higher education (…) is more by accident than by design '(Jackson, 2006).
4. For many higher education teachers creative thinking techniques and their possible applications to their teaching are unfamiliar. In addition, since being creative means different things in different disciplinary contexts and the sites where creativity is accomplished, the means by which it is achieved and the results of creativity will also be different in different disciplines (Jackson & Shaw 2006).
5. Teachers and students perceive several barriers that inhibit creativity in the learning process. These barriers include organizational structures, lack of resources, and attitudes of some students, staff and other teachers.

But, in spite of these barriers, there are also still many opportunities and fields to explore with a very important potential to develop students' creativity in higher education. Group learning approaches and collaborative projects are one of these promising lines of work. Students can bring different perspectives to carry out particular tasks and projects, facilitating the attainment of original or unexpected outcomes. The sharing of ideas and the collective effort may, on the other hand, encourages individual initiatives, as many authors recognise. Miell and Littleton (2004) even suggest that all creative endeavours are 'essentially collaborative'.

Collaborative projects combined with a problem based learning approach can be a convenient starting point to support the creative side in the learning and teaching process. However, these projects must adopt approaches that explicitly promote creative thinking. And, to overcome the fact that creativity is rarely an explicit objective of the learning and assessment process (Jackson, 2006), it should be included in the assessment criteria explicitly.

Interdisciplinary projects also offer many possibilities for creative learning. When a project requires working across or between disciplines it may generate new or original outcomes. Integrating content from two or more disciplines, going across disciplinary boundaries, building connections, and relocating ideas generally involve creating something new (Dillon, 2008). There are specific strategies that can be used to

stimulate creativity when working cross-disciplinarily, placing the emphasis on tools of connection, like comparison, association, analogy, metaphor, mapping and blending, which are included in the concept of combinational creativity by Boden (2009). In addition, some transferable skills closely related to creativity, like fluency, flexibility, or originality, can be applied to many disciplines regardless of expertise (Dillon, 2008). Thus, crossing discipline boundaries and applying a combination of modes of thinking in the generation of new outcomes may constitute and additional path for promoting creativity in higher education.

In a review of several studies, Bray et al. (2000) note that all of them coincide in presenting a complex and interdependent relationship between group process, group-learning processes and the production of knowledge within groups, but state that the most important factor differentiating learning groups from traditional task groups is the explicit intentionality of learning. We deeply agree with these authors when they mention that collaborative learning rests on the fact that individual experiences of the group members become the content of the group action and reflection and thus, 'individual learning both informs and is informed by group learning'. Students benefit from the sharing of ideas and the collective endeavour tends to encourage individual initiative (Jackson, 2006).

From a socio cultural position, authors like Moran and John-Steiner (2004) propose that interactions among partners create new properties that build on each other towards creative outcomes, identities, and relational possibilities. This process is dynamic and flexible since collaborators' motivation and identity are continuously developed in the process. There is a transformation of the domain, but also of the involved individuals.

Results

Following the previous premises, we are encouraging the development of creativity and innovation through collaborative projects in the first year of the degree in Actuarial Science at the University of Málaga. The courses that implemented the collaborative projects (Actuarial Statistics and Banking, Insurance and Securities Law) are involved in an experimental project of teaching and learning methods innovation since 2007 (Fernández-Morales and Mayorga-Toledano, 2011), within the general framework of adaptation of the current didactic strategies in Spanish universities to the European Higher Education Area. In this project, we are following a blended strategy, combining traditional with e-learning and m-learning resources, with an efficient integration of these components into a coherent learning and teaching process (Mayorga-Toledano, 2010). Our general objective is to support an integral instruction that encourages a continuous tuning of the future professionals to the changing conditions of the market and a permanent update of their knowledge, including the development of critical and creative thinking (Fernández-Morales, 2010).

In order to have a previous assessment of the meaning and importance of creativity for our students, we conducted a short survey during the second week of the course. The demographic composition of the sample is detailed in table 1. The students' average age is 24.15 years. This relatively high average age is due to the fact that Actuarial Science is a very specialized field, and this degree is often taken by students with a finished degree in Business Administration or Economics or by young professionals as an additional training to enter into the Insurance segment of the professional market. It is also significant the percentage of students who are also working while they are studying, a 31% of the sample.

Table 1: . Demographic composition of the sample

Age	Mean	24,15
	Min.	21
	Max.	43
Gender	Female	51 %
	Male	49 %
Occupational status	Only studying	69 %
	Also working	31 %
n		42

In the questionnaire we provide eight different definitions of creativity and asked students to rank their rate of disagreement/agreement with each one in a scale 1-5. The definitions have been inspired by the research undertaken within the Imaginative Curriculum Network (Working Group on Creativity and Innovation, 2007). Table 2 shows the survey averages for the eight definitions in descending order.

The concepts of creativity with the highest averages are 'generating new ideas' and originality (4.4 and 4.3, respectively). In the group of definitions with an average equal or greater than 4.0 is also 'doing things no-one has done before'. It seems that our students have a concept of creativity closely related with originality and 'the new'. In addition, the next definition in descending order is 'producing new things' (with an average rank of 3.6). The rest of the provided definitions were ranked with an observed average in the interval (3.0, 3.5), being the least valued 'working at the boundaries of your academic or professional field'.

We have performed difference of means tests by gender, age groups (less than 24 and 24 or more) and occupational status (only studying and also working) and have not find any significant difference in the average rank of the eight definitions of being creative. The only exception is 'Seeing things in a different way', which is valued by women with an average of 3.7, significantly higher (at .05 significance level) than the male's average, 3.2. These results indicate a very homogenous concept of creativity within the students of our discipline.

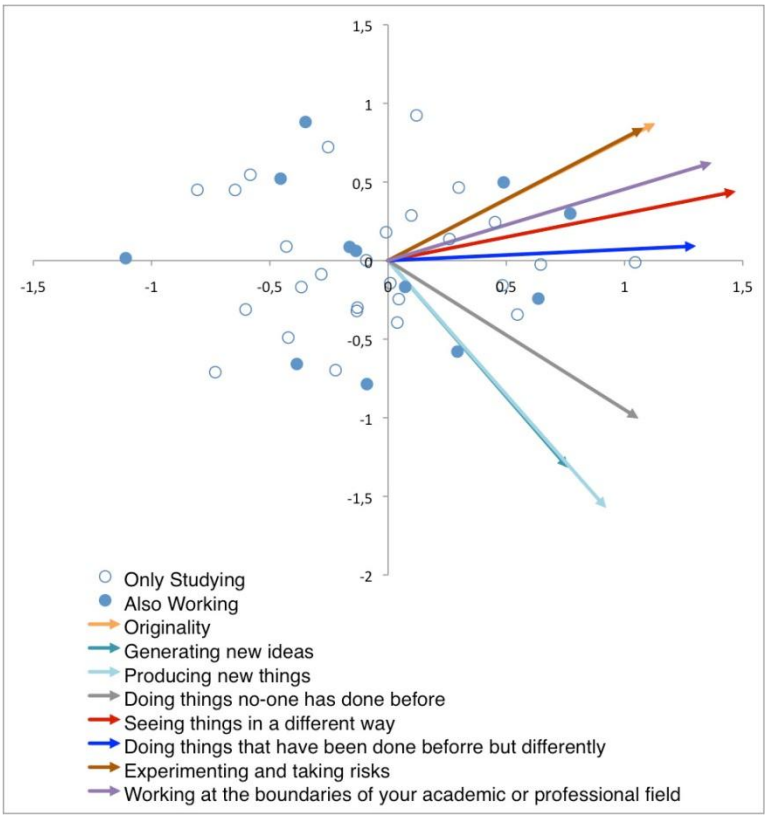
Table 2: What does being creative mean to you?

		Occupational status		Sex		Age	
	Total	Only studying	Also working	Female	Male	Less than 24	24 or more
Generating new ideas	4,4	4,3	4,7	4,4	4,4	4,3	4,5
Originality	4,3	4,2	4,3	4,3	4,2	4,2	4,3
Doing things no-one has done before	4,0	4,0	4,0	4,1	4,0	3,9	4,2
Producing new things	3,6	3,7	3,4	3,8	3,5	3,5	3,8
Seeing things in a different way	3,5	3,5	3,2	3,7	3.2*	3,5	3,4
Experimenting and taking risks	3,4	3,3	3,5	3,5	3,3	3,6	3,1
Doing things that have been done beforre but	3,2	3,4	2,9	3,5	3,1	3,4	3,1
Working at the boundaries of your academic or professional field	3,1	3,1	3,1	3,3	3,0	3,2	2,9
* Difference is significant at $\alpha = 0.05$							

A further insight into our students' concept of creativity is illustrated with figure 2. The biplot shows a graphical representation of both the students in the sample (observations) and the definitions of being creative (variables). Highly correlated definitions point in the same direction, while uncorrelated definitions are at right angles to each other. Otherwise, points that are close to

each other represent students with similar perceptions of being creative. Regarding the different concepts of being creative, two main groups are found: (i) producing new things, generating new ideas and doing things no-one has done before, and (ii) originality, experimenting and taking risks, working at the boundaries of your academic or professional field, and doing things that have been done before, but differently; being the second group less homogenous than the first one. With respect to the students, we distinguish by occupational status, to show that there is not a clear pattern that make a distinction between the two groups in their concepts of being creative. Similar patterns have been found grouping by gender or ages.

Figure 2: Different meanings of creativity (bioplot)



The second part of the questionnaire is dedicated to the importance that should be given to creativity in the degree of Actuarial Science. Students were asked to rate in a scale 0-10 the importance it should be given in their own opinion. The results of the survey indicate that our students give a relatively high importance to creativity, at least when they are directly asked for it. The mean importance in the sample rises to 6.9 (see table 3).

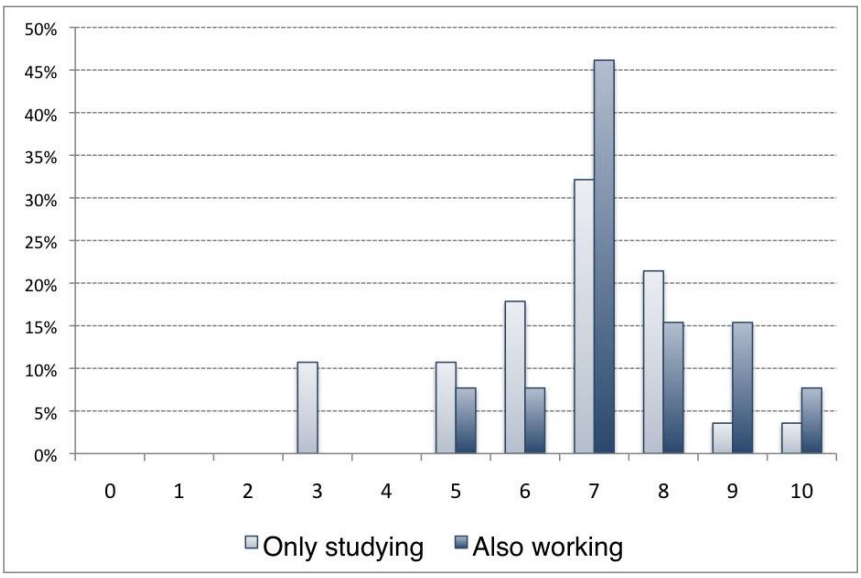
With the answers to this question, we have also performed difference of means tests by gender, age groups and occupational status. In this case, there is a significant difference in the mean importance distinguishing by occupational status. Students who are also working gave a higher mean rate to the importance that should be given to creativity (7.5) than students who are dedicated exclusively to their university studies (6.6). A deeper insight into this difference is illustrated in figure 4, where the distribution of answers for the two groups is showed. In both cases, the median (the more frequent) answer is 7, but lower rates are more frequent in the group of 'only studying' and, conversely, students who are also working gave more ratings over 7 than the other group.

On the other hand, the observed differences in estimated means between male and female students and by age groups are not statistically significant.

Table 3: How much importance should be given to creativity and creative thinking in the degree of Actuarial Science?

	Mean	Sig level (unil.)
Total	6.9	
By occupational status:		
Only studying	6.6	0.0398
Also working	7.5	
By sex:		
Female	6.7	0.3508
Male	6.9	
By age:		
Less than 24	7.1	0.1190
24 or more	6.5	

Figure 3: How much importance should be given to creativity and creative thinking in the degree of Actuarial Science? (by occupational status)



Turning our attention to the collaborative projects design, our students are required to work in groups of six to develop a collaborative project along the first semester in two courses. The outline, basic rules and calendar of the collaborative projects are available on line at the campus virtual of the courses since the beginning of the academic year.

During the first two weeks, students may freely choose the composition of their groups, but after the third week, the ungrouped students are randomly put together. In any case, the teachers recommend the formation of groups with a considerable degree of heterogeneity, i.e. including students that are working with others that are not, and mixing students with different backgrounds (Statistics, Economics, Law, Business, ...), etc.

The methodological approach we chose for this activity is the problem-based learning. Each

group chooses a topic that is labelled with a general title and a question, representing a problem to solve. The topics are often controversial and unresolved problems (e.g. should the impact of credit rating agencies on financial markets be publicly controlled? or is there a limit to human longevity? and, how does if affect to life insurers?). The teachers provide some topics, in order to facilitate the selection of themes and to ease the identification of the kind of work that is expected. We insist in the use of topics and problems with an intrinsic interest or value in the 'real world', preferably interdisciplinary, and with a future oriented perspective.

Thus, we are tackling two of the four core characteristics of creativity in the higher education context identified in EUA (2007): future orientation and problem-solving ability.

At this point, it is important to note that for an actuary managing risks is an everyday competence. A short video published by the Institute of Actuaries is a very helpful resource we use to introduce our students to the importance of dealing with risks in this professional field. In the video an actuary and two students explain their views of the actuarial profession and state some meaningful citations like 'Risk is everywhere. Actuaries help companies to harness the unknown and make more informed decisions' or 'An actuary is someone who aims to understand, to communicate, and to manage risks.' This tool has a very interesting impact in our students, who discover some creative ideas in this short video, like the images of an accelerated clock and other fast motion images that underline the concept of thinking in the future, and the possibilities of creative thinking for communicating concepts.

We encourage a future orientation in the collaborative projects. Due to the importance of forecasting and predicting future scenarios in the actuarial activity, that requires dealing with uncertainty, and as a consequence, with the risk of failure, we value innovative approaches, even going beyond established knowledge and interdisciplinary approximations.

In order to assess the process and generate an adequate feedback before their final presentations, the groups are required to elaborate some intermediate outputs: a critical analysis of a scientific, professional or newspaper article that addresses the topic, and a conceptual map. By assessing not only the final product but also the process, we try to not inhibit taking risks and thinking 'out of the box'.

In addition, our aim is the design of temporal schedules that allow enough time for reflection and quality feedback. After choosing the topic, the working groups have one month to produce their first output, a critical analysis of a paper that addresses the chosen theme. The objective of this first activity is exposing our students to the established knowledge of their topic. In this initial stage we are interested in a more structured activity, in order to check if the students in the groups reach a correct understanding of the concepts and methods, in order to proceed to more creative stages of their collaborative project.

The next month, while the groups are working in their respective themes, they are required to provide a concept map of what they are working. The first versions of the concept maps are loaded on line, and are available to all the groups. Thus, interaction between groups is facilitated. Furthermore, the feedback to the groups takes place in the classroom in a discussion session. After these discussion sessions dedicated to the concept maps, the groups should update their concept maps during the rest of the course.

Among other reasons, stated before, we try to avoid well-defined topics, which are available in textbooks, because it is known that these topics, in general, allow students to produce high quality concept maps, but these concept maps usually lack originality (Kinchin et al., 2005). And our primary goal is not the quality of the concept maps, but to promote creativity by means of using concept maps as instruments. Students were required and were permitted to freely make connections, be creative and find new visual links.

As it was mentioned before, the actuarial profession demands independent and creative abilities, and the use of concept maps can improve the creative and independent learning abilities of our students. Concept maps require

the development of freely associated connections among concepts, and this process may enhance the deductive, logical and creative abilities of the student. This was observed by Chiou (2008) in a study in the Management field. As Novak and Cañas (2008) state, 'Learners struggling to create good concept maps are themselves engaged in a creative process, and this can be challenging, especially to learners who have spent most of their life learning by rote'.

Concept maps have an additional feature of great interest for our project, the possibility of including cross-links. These are relationships or links between concepts in different segments or domains of the concept map, and in the creation of new knowledge, cross-links often represent creative leaps on the part of the knowledge producer (Novak and Cañas, 2008). For this reason, this feature of concept maps, which allows the ability to search for and characterize new cross-links, is very interesting in the facilitation of creative thinking.

In addition to the previous considerations of the convenience of concept maps for our project, concept mapping is also an excellent tool for making better inter-connections between courses (Chiou, 2008). In our case, students of the first year in the Actuarial degree often find it difficult to integrate the contents of the several courses into a coherent construct due to their varied nature, e.g. Demography, Legal Regulation, Accounting, etc. The use of concept maps in this way helps students to discover the importance on connecting different disciplines and how it favours the creation of new knowledge.

The final of presentation of the results of the whole semester work takes the form of a role-play. Each group can freely choose the form of the presentation, a press conference, the launch of a new product, a scientific conference, etc., and assign the roles to the group members and to the rest of the students. Although all this possibilities were available, this year all the groups chose the form of the press conference, maybe because it is the most familiar to them and it implies less volume of additional work.

However all the groups tried to be creative in the simulation of the press conference. All of them used varied audiovisual resources, including a videoconference with a team member who was at work in a big company simultaneously to the press conference, video recordings of a TV interview to a very famous scientific, shots of TV documentaries, statistical simulations in real time, etc.

Some of the groups focused their creative contribution to engage the 'public' (the rest of the students) in the role-play. For example, one of the groups provided a leaflet, which underlined in very bold letters the main question of their work 'Does compulsory use of unisex life tables in life insurance reduce gender discrimination?' and ended with the question 'And what is your opinion?' In this way, after their exposition of the main facts of this controversial topic, a very interesting discussion session was initiated with the participation of many of the present students.

Other group used a different strategy to involve the public in the role-play. They conducted a survey about the future trends of human longevity and the perspectives of pension funds sustainability in the medium run. Once they had shown the results of the survey, they passed copies of the questionnaire to the public and compared the opinions of the 'public' with the results of the survey.

Creativity and innovative thinking are explicitly stated in the assessment criteria that our students are given at the beginning of the semester. The assessment of the collaborative projects was focused on the process as well as on the outputs. The intermediate outputs, the critical analysis and the concept map were assessed during the course, and the groups received feedback. The final presentation was assessed at the end of the course, and the whole process was also evaluated. With this process we are trying to improve the students' capacity to diagnose accurately and responsibly the strengths and weaknesses in their own forms of cognition as revealed in their work, as in the suggestion of Cunliffe (2008).

The teachers of each course were responsible of the assessment of the collaborative projects, but the students participate in the evaluation of the group process. Their participation was managed

by a survey conducted after the last final presentation. Every student assessed the presentation of every group and the collaborative process of his/her group.

The most complex part of our methodology design was to settle the assessment criteria.
From the rubrics included in a recent work from Clary et al. (2011) that addresses tools for scoring creative projects (explanation, interpretation, storytelling, abstraction, elaboration and originality) we adapted to our projects the criteria for originality. We also adapted explanation and interpretation, introducing some elements from Wiggins and McTighe's (2005) categories for meta-cognitive thinking, which have also been applied to assess creative products.

In addition, the criteria for flexibility and adaptability and risk-taking despite mistakes were adapted from the Metiri Group proposals (Lemke, 2010).

Finally, we included other three criteria: problem solving and cross-disciplinary; cooperative and organizational abilities; and presentation.

The full set of assessment criteria is therefore comprised of:
1. Elaboration and explanation. Whether it is a naive or superficial account or, on the contrary, a fully supported, invented, verified, deep one.
2. Problem solving and cross-disciplinary. Quality of the demonstrated problem solving abilities and the range of alternatives or innovative solutions.
3. Originality. Absence of commonplace ideas and expected usage and developing of unusual ideas or elements, especially if a complex and rich approach, far outside the ordinary is used.
4. Presentation (only for the final presentation). Demonstration of skilful technique or use of media, instruments, voice, body and communication strategies.
5. Flexibility and risk taking during the process. Ability to see multiple ways of reacting to changes in the project conditions and feedback, negative or positive, and to adjust his/her own position in response to change. Confidence in his/her abilities to see that mistakes are not personal failures, but challenges.
6. Cooperative and organizational abilities. Demonstration of possessing organizational ability and working co-operatively to achieve the group aims.

Conclusions

The importance of creativity per se in the higher education discourse is gradually becoming more significant, linked to the notion of personal fulfilment and transformation within a rich and complex university experience. But creativity is also closely related to the concepts of professional accomplishment, adaptability to market changes and better attitudes towards taking risks, conferring a new interest from the point of view of higher education institutions. Furthermore, in disciplines that require working with and managing risks, and predicting variables with multidisciplinary models, like the actuarial profession it could be even more beneficial to pay attention to creativity in the curriculum design.

In this field, the group working approach, in general, and being more particular, the use of collaborative projects in the learning and teaching approach may constitute a useful instrument because it allows a more creative thinking process along the courses, and also may incentive the intentionality of creative learning.

Our experience in the degree of Actuarial Science at the University of Málaga, using collaborative projects, has been based in a problem based learning approach, using a mixed face-to-face and virtual learning environment, in which creativity is explicitly included in the assessment. The main results of our experience revealed that the students involved in the project showed a notable degree of satisfaction with the design and outcomes of the courses, and they produced more creative results than in previous years with more traditional approaches. Thus, we observed that group working encourages creative solutions with this kind of course design, comparing with more conventional designs.

In addition, our students showed a very homogeneous concept of creativity. It is primarily related to originality and the new. As a secondary element in their view of creativity we found the notions of experimenting, taking risks

and working at the boundaries of their academic or professional field.

Furthermore, it seems that a real experience in the professional and labour market reinforces the relevance that students attribute to creativity, since although almost all the students declared that they consider creativity is important in their curriculum, this was more intensely stated by those who are already working.

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Active learning with the help of the informal caregiver, an innovative project in nurse education

Kurt Debaere & Herlinde Dely

Abstract

In 2007, University College West-Flanders (Howest, Bruges, Belgium) started the project Mantelluisteren. For this project, (1st year bachelor) nursing students become acquainted with professional care and informal home care during active learning moments. Each student makes four home visits to an informal caregiver who cares for one or more care recipients. The project Mantelluisteren appears to be, in addition to active learning opportunities for students, a response to the need for a listening ear with many caregivers. With this project, caregivers feel acknowledged in their role as professional expert and feel strengthened in their capacities.

Keywords

Informal caregiving, experiential learning, nursing education

Introduction

In view of the approaching (double) ageing and the trend towards deinstitutionalization in western society, focus in caring more and more shifts towards home care. Therefore, a good cooperation between the caregiver and the health care professional and the corresponding demand-driven care, appears to be essential to create a sufficiently large support in order to enable home care. Within nursing - both intramural and extramural - one becomes increasingly aware of the crucial role of caregivers and the potential burden they face (Lodewijckx & Jacobs, 2006).

On April 23, 2007, Kurt Debaere (nursing lecturer at University College West-Flanders), was invited at a local gathering for caregivers to talk about communication difficulties in home care. What struck him most was the vulnerability of the informal caregivers and their need for individual recognition and individual emotional support. The energy the caregivers radiated, the experience they shared abundantly, the sincere caring etc. were examples of an inviting and inspiring enthusiasm. Kurt took these impressions with him to the nursing department where the team reflected on how they could on the one hand meet the noted needs for recognition and support of the informal caregivers and on the other hand share this experience with the students. It would give the latter the opportunity to learn about psychosocial care and home care. In cooperation with the CM, the Belgian Christian Health Insurance Fund, the project Mantelluisteren was born. In this project, first year students make four home visits to informal caregivers in their home situation.

Mantelluisteren, the course

The project Mantelluisteren is implemented in the second semester (1st year bachelor) of the nursing program at University College West Flanders. It is part of the course 'The socially committed nurse "(2 credits) and consists of several parts.

Before the home visits take place, there is a first gathering with all the informal caregivers who take part in the project. The caregivers get acquainted in a friendly atmosphere, there is a testimony of a caregiver and a student, who already took part in the project and all the necessary information about the project is given.

In preparation for the contact with the caregiver and his/her care situation, the curriculum provides ten lessons in which students focus on the following themes: caregiving, home care, counseling, theoretical conceptual frameworks to support the contact with the caregiver, bereavement, life events etc. Moreover, the students are given a possible substantial guideline to structure the conversations during the home visits. At the end of the semester, each student is given the caregiver's contact information. Matching the student to the informal caregiver is done by the lecturers and is primarily based on residence. The students personally contact the caregiver and make four appointments for visits in the home situation. The first visit emphasizes the care recipient and the second one the informal caregiver. During the third visit, students receive the opportunity to talk about professional home care. The fourth and final visit is made as a completion of the project. Students must, however, in the first place adjust to the caregiver. He/she also steps into this project with his/her expectations and boundaries. It is primarily the caregiver who determines what he/she wants to talk about. In support of these home visits, every other week, coaching sessions in groups of 5-6 students are provided, during which both the lecturer and the students reflect on their experiences. After each home visit, students post a report on the content of the visit. Two weeks after the final home visit, the University College organizes a final meeting at school with the students and the caregivers. The caregivers are thanked for their commitment.

The project Mantelluisteren was launched in 2007. Since the beginning of the project, three other schools in West-Flanders stepped into the footsteps of our University College. This academic year, 23 informal caregivers took part in the project. The number of enthusiastic caregivers is larger than the number of first-year students participating in the project.

Mantelluisteren, an example of experiential education

'Learning is the process whereby knowledge is created through the transformation of experience'
Kolb, 1984

Experiential education focuses not only on the development of cognitive skills, but also on the overall experience in the learning situation (Van Herpen, 2007). Learning is hereby seen, according to Kolb's Experiential learning theory (ELT), as a process rather than as an outcome. It is therefore important not to solely rely on the cognitive ability of the student, but to encourage him/her to see learning as a holistic concept – this is involving thoughts, feelings, behavior and perception. The start of this journey is the concrete experience to which students are exposed. What they observe is converted into reflections, from which abstract concepts can be distilled. This 'abstract knowledge', can be applied in future situations and can serve as a basis for further action (Kolb & Kolb, 2005).

The project Mantelluisteren at University College West-Flanders is an example of experiential or active learning in higher education. The four home visits give students the chance to step into a real care situation that informal caregivers face every day. Due to the empathic way in which the student is present, he/she is given a clear illustration of everyday life of the informal caregiver. The project Mantelluisteren gives students the opportunity to explore topics such as home care and caregiving and to take initiative. The student is free - within broader limits – to determine the form and content of the home visits and the structure of the written reports. The given freedom is however not unlimited. The students receive the necessary guidance at school before and during the project. It is for instance the school that, for practical

reasons, decides which student is paired with which caregiver. Moreover, the theoretical course week gives the students a possible guideline to structure the home visits. Experience shows that some rather introvert students are in need of such structured guidelines. The students are free to use these guidelines. The project Mantelluisteren aims at enhancing freedom, responsibility and the sense of involvement of students in an informal home care situation. Knowledge and skills that are acquired with a high sense of commitment, are fundamental markers in the development of the student. He/she literally steps into the world of the informal caregiver and the care recipient, inquiring a number of practical and emotional aspects of the care situation. The fact that the students actually are part of the care situation and that they hear many personal stories, increases the students' engagement to home care. Evidence of this increasing involvement is found in (anonymous) in-depth interviews with students, two years after having participated in the project.

"If they had just given us courses about informal caregiving, I would have thought 'Ok, informal caregiving: taking care of someone'. But it's so much more than that! Thanks to Mantelluisteren, I realize that family caregivers can have a breakdown and that they sometimes just need a moment for themselves. For me, Mantelluisteren was a very positive experience."

"Thanks to Mantelluisteren, I broadened my horizon. If someone comes to the hospital, for example, many nurses seem to only focus on the patient and they ignore the informal caregiver. But we must understand that the caregiver too loses his certainties. In fact those people sometimes know more about the care than we do. Thanks to Mantelluisteren you keep that in mind and you more easily start a conversation when you meet the informal caregiver."

Interviews with fourteen third-year nursing students showed a unanimous praise of the project Mantelluisteren. The students said that they initially felt uncertain about going to a stranger in an unknown home situation. One by one, however, they reported having experienced a very friendly atmosphere during the interviews with the caregivers. Some students still have regular contact with the informal caregiver, two years after they took part in the project. All students (14/14) experienced Mantelluisteren as an added value in the curriculum and said having felt its influence in their current internships. They indicate that, thanks to the project, they not only give attention to the patient, but also to the person/people behind the care recipient. They are also more eager to talk about the burden observed with the informal caregivers and to give them tips and advice for engaging professional assistance in the home situation.

Mantelluisteren, meeting the needs and the burden of informal caregivers

Various sources indicate that most caregivers have both positive and negative care experiences. Taking care of a parent, a partner, a child etc. is for most people more than just an obligation. Because of the strong emotional bond created by their social relationship, the caregiver often feels to be the most appropriate person to care for a loved one (Chambers, Ryan, & Connor, 2001). Caring at home usually excites many positive feelings. Caring for someone may lead to love, joy, humor, gratitude, satisfaction, self-esteem and add meaning to someone's life (Opdebeeck, Van Hove & Van Audenhove, 2003; Buijssen & Adriaansen, 2005). For many caregivers, however, the burden is so overwhelming that the positive feelings are largely or completely overshadowed by the negative ones. The feeling of experiencing both positive and negative feelings at once is also described in literature (Buijssen & Adriaansen, 2005). Research shows that, besides the financial burden, a lack of information, an administrative burden and a burden due to household chores, the psychosocial burden in informal caregiving is considerable. Flemish research reports that approximately 60% of the caregivers experiences an emotional burden (Jacobs & Lodewijckx, 2004). More than one third of the informal caregivers feel that their social life suffers from this care they are giving. Examples of this psychosocial burden are: role redefinition and role reversal, new and often intense emotions (fear, sadness, uncertainty), need for recognition, need for a listening ear, less contact with family and friends etc. Informal caregivers indicate that being able to share their feelings and thus their underlying recognition

relieves the burden somewhat, even if the feelings towards the care recipient are predominantly positive (Buijssen & Adriaansen, 2005). Research has shown that supporting caregivers increases the professional caring competences and decreases the need for hospitalization of the care recipient (Nolan, Grant, & Keady, 1996).

In the spring of 2012, thirteen semi-structured in-depth interviews were taken from intensive informal caregivers, in which the various aspects of their burden were inquired. Some quotes from informal caregivers illustrate the major psychosocial impact of caregiving and the need for a listening ear.

"Yes I do recognize all of these things. The emotions, the fear. Oh, I've had so much fear and sadness. And uncertainty: What is going to happen next? You never know, do you. And need for recognition? yes, that's the way it is, because, your friends, you hardly ever see them. And most people don't really listen to your story. If they see my husband, they always say: 'You can't complain, your husband looks good, doesn't he?" (Josianne, takes care of her partner after he had a stroke)

"… but being able to share your sadness, your heavy burden, anonymously, as I do now with you, that is good. It is such a relief." (Irma, takes care of her daughter who suffers from a congenital disorder and of her husband who has a brain trauma)

"In the beginning people come, yes. Yes. Now they don't come anymore. It's quite a job, you know. People just drop back. You know, once, someone even said to me 'you can be ill for too long too… '." (Lucien, takes care of his wife after stroke)

The project Mantelluisteren shows to be a very rewarding experience for most informal caregivers. Several positive aspects are mentioned: the social contact, being able to share emotions and experiences, coaching young people on the threshold of their professional lives, etc. Caregivers often tell us that sharing the burden with friends and family is not that obvious because of ignorance of the listener or because the informal caregivers fear to burden someone with their feelings, thoughts and emotions. Moreover, confidential information is sometimes used against the informal caregiver. In Mantelluisteren, however, caregivers like to share their emotions because they don't feel as if they are burdening someone else. On the contrary, they feel like contributing to the professional career of young enthusiastic people.

"According to me, Mantelluisteren helps people handle the daily care. There are two reasons: Firstly because someone takes the time to listen to you and secondly because you can listen to the stories of the student. It makes you feel like you're not on your own." (Georgette, takes care of her mother who suffers from dementia)

"Mantelluisteren makes you feel valuable because they [the students] sit there and come especially for you. They come to listen. It gives me some recognition and boosts my identity. Yes, Mantelluisteren, it has meant a lot to me. It has lend my life another color, just by knowing that you're not alone."

"Look, this is my situation, but by telling you this, I haven't put a burden on your life, for example. For me, this project is something I want to do because for me it is important to know that I can help. Notwithstanding that this is about something that is not all that rosy, but it is valuable for me."
(Irma, takes care of her daughter who has a congenital disorder and of her husband who has a brain trauma)

"For me, Mantelluisteren was a rejoicing experience because I had someone to talk to, you see? Since, you know, I can't talk to my husband anymore. Talking to a wall would be the same as talking to my husband." (Ann, takes care of her husband after he had a stroke)

Conclusion

The project Mantelluisteren was established in 2007 and is a collaboration of the Nursing Bachelor program, the University College West-Flanders and the CM (Belgian Christian Health Insurance Fund). Mantelluisteren is a form of experiential learning in which students get the opportunity to be part of a real informal caregiving situation during four home visits. The topic of informal caregiving introduces the students in the psychosocial aspects of care. The informal caregivers take up the role of coach and expert during this period. Based on literature and recent in-depth interviews with informal caregivers, the project appears to meet a number

of psychosocial needs of the caregivers: the need for a listening ear, need for social contact, emotional processing, recognition etc. The students on the other hand experience Mantelluisteren to be a broadening of their horizons. They indicate that the project opened their eyes for the crucial role of the informal caregiver. Moreover, they report their intention of involving the informal caregiver in the care they are giving, both intramural and extramural. All students intend to implement these new perspectives on psychosocial care, besides medical care, in their internships and future job as nurses.

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ICT Support for Creative Teaching of Mathematic Disciplines

Jan Luhan, Veronika Novotna & Jiri Kriz

Abstract

The article deals with selected issues of teaching of mathematic disciplines at Czech higher education institutions. Specific focus is on teaching at the Faculty of Business and Management of the Brno University of Technology (BUT) based on the periodic student survey concerned with approach to and utilisation of ICT, mathematical and statistical methods. The authors of the present article identify utilisation of information and communication technologies (ICT) together with cognitive technologies and approach as the way towards strengthening and supporting the position and role of mathematical and statistical disciplines in teaching and development of student creativeness in addressing practical tasks in their respective fields of study.

Keywords

Creativity, teaching, mathematic disciplines

Introduction

Teaching of mathematics at schools of all levels has faced numerous problems for years. The subject, long understood as one of the unquestionable education basics, has been shifted among subjects of marginal interest of the general public. Mathematics is often ranged among unfavourable subjects among pupils and students, for its apparent tediousness, difficulty, detachment from the reality and even uselessness.

These issues are obviously reflected in university teaching of mathematics as well. A relatively more favourable is the perception of subjects directly related to mathematics usually opted for by students liking the very subject of mathematics. Problems are encountered at departments where technical subjects are taught, for students more than ever before find it difficult to cope with the requirements of the subject of mathematics in their curricula, despite the reduced requirements of the faculties in comparison to the past. The least favourable is the situation in the field of humanities, such as economics, sociology, law, etc. Here you can most often come across the opinion that mathematics (statistics, logic…) is good for nothing. This is an opinion held not only by students but also by some teachers.

The question is how to prepare lessons in mathematics, especially in curricula for "non-mathematicians", how to make the subject more interesting for the students, how to facilitate its understanding and above all how to show that mathematics can perform an important role in their lives either as a discipline offering a lot of useful practical instruments or as a subject refining systematic and logical thinking and developing the ability of objective perception of facts, and last but not least as a field of study contributing to the development of creative approach to resolving everyday life problems.

One of the options of encouraging interest in mathematics among students and their creativity is to use means offered by ICT technologies.
Utilisation of ICT in teaching of mathematics has become a subject of interest among teachers of mathematics. Some ICT instruments are integral to mathematic studies already. They are graphic calculators and computerized graphing, specialised software, programmable toys or floor robots, spreadsheets and databases.

Involvement of computers and all ICT technologies in the teaching process can take different forms and quality levels. Computer can be understood as a tool with the help of which the teacher prepares his teaching aids, as well as an environment in which the whole class works on solution of a certain mathematic problem.

This article focuses on the options of utilisation of ICT technologies in teaching of mathematics at schools of higher education. One of its integral parts is also an analysis of results of a survey aimed at finding opinions and approaches of students of the Faculty of Business and Management, BUT towards computer technology and its potential utilisation in teaching of the subjects of mathematics and statistics

Teaching of Mathematics

With a certain simplification you can define the role of a mathematics teacher as "to learn mathematics and transfer this knowledge onto the student". In other words: To perform a transmission, or transfer. This is also the origin of the term "transmissive teaching". Understanding of teaching of mathematics as a transmission an emphasis is placed on how to teach mathematics to the student, i.e. the objective is mathematics itself, its school form, and the quantity and quality of the transmitted knowledge.

Recent pedagogic approaches, also applied to teaching of mathematics, are new and somewhat different, though. One of them is the so called constructivism, or cognitivism.

One way to help teacher-education students develop more constructivist-oriented pedagogical views is perhaps to directly engage them in knowledge building practices (Chai & Tan, 2009; Hargreaves, 1999; Hong, Zhang, Teo, Scardamalia, 2009). A published study (Hong, Chang. 2010) investigates the impact of engaging teacher-education students in sustained design and knowledge building practices in mathematics teaching on their views of mathematics and mathematics teaching. Preliminary results suggest that teacher-education students became progressively more adaptive in their teaching practice. More importantly, their views of mathematics became more constructivist-oriented, and in the meantime, their views of mathematics teaching also became more student-centred.

Procedures of Teaching of Mathematics

As for views of mathematics teaching, they may be broadly classified under the knowledge transmission category or the knowledge construction category (Entwistle, Skinner, Entwistle & Orr, 2000; Handal, 2003; Samuelowicz & Bain, 2001).

At present didactics of mathematics defines four procedures applies to mathematics teaching:

1. **Mechanical** – corresponding to understanding of learning as a system of reactions. You can drill the students to teach them mechanical arithmetic, algebraic and geometrical operations and problem solving that is classifiable on the basis of certain features and solvable on the basis of certain formulae.
2. **Structuralist** – explainable by two examples: traditional geometry arranged on the basis of axiomatic construction and the so called modern mathematics based on the theory of sets and logic.
3. **Empirical** – based on practical needs of the fields to which it is to serve. Teaching utilises experience of the pupils but the pupils are not taught systematic and rational processing of this experience.
4. **Realistic** – based on the principle that learning mathematics means construction of mathematics by the pupils´ own procedures from informal approaches linked to the reality towards something acceptable as formal mathematics.

Approaches to Mathematical Tasks

The fundamental aspects of mathematics teaching include explanation. Students must logically understand the individual elements of the curriculum to be able to apply the theoretical knowledge to practical solutions overlapping to other areas. When resolving mathematical tasks where the solution procedure is not yet fully grasped the following methods are used:

- **Analytical** method – based on proceeding from the unknown towards the known, and allowing to use judgement and arrive at new solutions.
- **Synthetic** method – a method using the opposite procedure, i.e. from the known towards the unknown (Blažková, Matoušková, Vaňurová, 2002)

The most favourable approach to solutions of mathematical tasks is a combination of these two methods, the

- **Analytical – synthetic method**

Mathematical Disciplines at Czech Schools of Higher Education

Teaching objectives at Czech higher education institutions are derived from the individual accredited courses and subjects, or lifelong education programmes. For the purpose of university teaching they are mainly cognitive and psycho-motoric objectives, which harmonises with the focus of the courses on ¨knowledge acquisition and skill training.

Students are also assumed to already possess a sense of the basic human ethical values and to be able to respect academic ethics too. Despite that the effective objectives also include teaching the students to take a certain "critical attitude" (Melezínek 1994).

Pursuant to the (Infogram) the objectives must be formulated in a way comprehensible for both the students and the teachers. The level of achievement of the set objectives is affected by factors like activity of the students in the classroom, standards of problem solving, ability of the students to apply acquired knowledge and skills in practical tasks and in other subjects as well as the results of interim and final assessment.

Teaching methods and forms depend on the curriculum, grade, course type (compulsory or optional) and focus (theoretical or practical).

Issues of University Mathematics

Let us try to specify the most frequent issues faced by university mathematics taught to students for whom mathematics is not the focus of their main interest.

a) **Low number of lessons not adequate to the teaching objectives**
The numbers of mathematical lessons at universities have dropped significantly recently and the limited number of lessons no longer allows managing the whole syllabus on a sufficient level. This necessarily leads to restrictions or omissions of certain themes, reduction of demand, and increased superficiality and survey-like nature of the teaching. There is usually no time left for the main object of mathematics teaching to "non-mathematicians", which is application of mathematical methods in their particular fields of study (such as economics).

b) **Heterogeneous student groups** (with regard to knowledge and approach to mathematics)
In the past mathematical knowledge of students entering university was much more balanced than today. This is caused both by cancellation of mathematics as one of the compulsory subjects of school-leaving examinations at secondary schools, and by greater differentiation of curricula of the individual types of secondary schools and obviously also by the increasing percentage of students continuing with tertiary education after completing their secondary level.

c) **Unwillingness to think logically, preference of memorising or search for "readymade" information**
Mathematics should develop, refine and train logical thinking. Some students, however, memorize definitions and the whole examples in the hope that this will be sufficient to pass their exam. They are not ready to accept that their learning approach bringing them success in other subjects (i.e. memorising) will not be successful in mathematics.

How to Approach Mathematics Teaching

It is often said that to effectively learn mathematics you need mathematical talent. This prejudice can only be countered by selecting suitable means of mathematics teaching helping to deny this deeply rooted idea. There are many methods, means and ways of work giving students space for their own activity and creativity.

New approaches to teaching of mathematics usually try to replace the traditional transmissive way of teaching, i.e. transmission of knowledge from the teacher onto the pupil, with other, more effective methods.

Constructivism directly opposes the transmissive approach to teaching. It is not important what is taught, but what is learned. Constructivism is based on empirical cognition when the pupil itself constructs new knowledge in confrontation with its existing experience. This procedure is therefore absolutely individual. New cognition results from interactions between existing knowledge and experience and new stimuli. That is why constructivism lays the main emphasis on the pupil as an active component of the teaching process.

Professor Griffith (Infogram 2009) insists that the basic features of mathematics no longer include readymade mathematical structures, but rather include seeking them. The way towards mathematics is then continuous construction of the world of mathematics. From this point of view constructivism is the natural and basic form of mathematical cognition.

Cognitivism is one of the paradigms of the so called cognitive sciences (together with connectionism and enactive approach). Cognitivism understands cognition as information processing (Teaching Objectives 2010). Computer technology is considered a beneficial instrument of this processing, therefore cognitivism is often combined with ICT technologies and use of computers in the cognitive process. Cognitive technologies in teaching are therefore represented by computer programs mimicking processes of conceptual thinking and therefore utilisable in mathematics teaching as support for solutions of mathematical or logical problems.

Utilisation of Cognitive Technologies

Cognitive technologies usable in mathematics teaching usually include these four [7]:

a) **Programs for tabular calculations and diagrams**
The issue of tabular programs is relatively well known and these programs are most frequently used in classrooms.

b) **Computer Algebra Systems**
The name CAS programs – Computer Algebra Systems covers programs which in addition to handling figures can also work with algebraic expressions and functions, change them, resolve equations, derive, integrate and even draw diagrams. Specialists software such as Computer Algebra Systems (CAS), Dynamic Geometry Systems (DGS) and Maths curriculum software improve pupils' skills and understanding in algebra, allow pupils to manipulate and measure shapes leading to higher level of learning among them (Hennessy et al. 2001; Clements 2000).
Capabilities of CAS programs can be classified as follows:

- Numerical calculations,
- Symbolic calculations,
- Diagram drawing.

Typical commercial representatives of this program group include MATLAB, Mathematica and Maple. While MATLAB is rather popular among technicians, Mathematica and Maple

attract more graduates from theoretical and natural science courses.

c) Micro-worlds and computer laboratories

In 1967 MIT laboratories developed the Logo project, whose father was Seymour Papert, one of the co-authors of pedagogic constructivism. The project was based on the principle of control of a mechanical tortoise moving along a sheet of paper on the floor and drawing lines on the paper through computer commands. In 1980 Papert published a book called Mindstorms [5], in which he introduced Logo as an instrument of logical thinking development, especially in children, but also in adults. The progress of personal computers, just starting at that time, later allowed for transferring the tortoise from the ground to computer screen. Programmable toys or floor robots controlled by instructions in programming languages (usually Logo) were one of the earliest applications of ICT to maths, and where used were the cause of significant changes in maths teaching (Becta 2003). Logo encourages pupils to develop problem-solving skills, leads them to develop higher levels of mathematical thinking as well as learn geometric concepts (Clements 2000).

d) Interactive geometry

Interactive geometry programs are instrument with the help of which the user can use an electronic liner, compass and colour pencils to demonstrate and simulate constructions in a work area, which may be either a computer screen or an interactive board. The use of graphic calculators and computerized graphing in mathematics speeds up the graphing process, freeing people to analyse and reflect on the relationships between data (Hennessy 2000; Clements 2000; Hennessy et al. 2001).

Computer entry to the teaching process created cognitive technologies performing the role of electronic teachers, kind of tutors, who lead the pupil, or in other cases experimental environments for creation and verification of hypotheses or micro-worlds simulating the reality by its simplified model.

Work with computer in mathematics has also affected change of the role of the teacher and the pupil and their mutual communication. The epistemological authority of the teacher is reduced, which in effect must greatly impact the teachers´ schooling. The teacher often becomes a technical advisor, a collaborator in problem solving (often occurring in the course of work and not predefined in the curriculum), or an agent facilitating group work.

In recent years, teacher education institutes have made efforts preparing pre-service teachers to integrate technology into their future teaching practices (e.g., Krueger, Hansen, & Smaldino, 2000). The related review of Kay (2006) summarizes key strategies to introduce technology to pre-service teachers: delivering a single technology course; offering mini-workshops; integrating technology in all courses; modelling how to use technology, etc.

As Ertmer (2005) has documented, the decision regarding whether and how to use technologies for instruction rests on the shoulders of teachers.

Despite the increased availability of ICT hardware (e.g., Ertmer, 1999), school related support for ICT integration (e.g., Baylor & Ritchie, 2002), and a larger consciousness of teachers about the importance of educational ICT use (e.g., Khine, 2001), relatively few teachers are willing to integrate ICT into their teaching activities (e.g., Becker, 2000; Hermans, Tondeur, van Braak, & Valcke, 2008; Wang, Ertmer, & Newby, 2004).

Opponents to cognitive technologies are afraid, though, that these technologies might become a support replacing mathematical skills and mathematical thinking. They point out that when students work with computers they focus on the technology itself more than on the actual mathematical problem to be resolved. It is therefore necessary to guide students towards awareness that ICT technologies are a mere tool helping them resolve a task.

Use of ICT

There are three broad categories of the applications of computers in the field of mathematics education: computer assisted instruction (CAI), student (educational) programming and general purpose educational tools such as spreadsheets, databases and computer algebra systems (CAS). (Aydin, 2005)

At present university teachers find it much beneficial to combine information technologies and maths and show students the options of use of the former for the purpose of the latter.

ICT technologies can be understood as

a) **A tool for teachers**
   The simplest way computer technology can aid mathematics teaching is to use computer as the teacher´s tool for preparation of his/her lessons. In the period when the university teachers become editors and often also publishers of their own textbooks and scripts, whether in the printed or more and more often in the electronic format, the above skills can be considered the minimum standard.
b) **A demonstration tool**
   Computer can serve in mathematics teaching as an instrument of demonstration with the help of which the teacher can present new knowledge. Computer-aided teaching needs a specially equipped classroom (with a computer and an interactive board or projector), which is often a standard at universities and colleges, though.
c) **A practical aid for exercise**
   Use of computers as practical aids used by the students themselves in mathematics lessons is the most demanding teaching method with regard to equipment. Such teaching must be implemented in a fully equipped classroom where every student or a pair of students at the most can use a separate computer. Capacities of computer classrooms in schools often fail to cover the needs of the teachers and therefore professional subjects are prioritised.

Mathematics Teaching at the Faculty of Business and Management

All bachelor courses accredited at the Faculty of Business and Management, BUT in Brno include at least two semesters of university-level mathematics. A prerequisite for successful passing this subject is good knowledge of secondary school mathematics. At present the knowledge of the individual students with which they enter the university reflects the current differentiation of curricula of the individual types of secondary schools and obviously also the increasing numbers of students who continue with tertiary education after successful completion of a secondary school. That is why the Faculty of Business and Management offers compensatory courses to facilitate their mathematical studies.

Teaching of mathematic disciplines at the Faculty of Business and Management, BUT in Brno is mainly oriented towards applied mathematics in economic subjects. There are efforts to approach these disciplines in complexity.

The basic mathematics taught at the Faculty of Business and Management, BUT provides sufficient background for contact with ICT environment in regular teaching. The natural trend in recent teaching is the need to make the students understand the theme but not to load them with numerical routines. And this is where deployment of suitable ICT tools performed a key role.

Success of computer aided teaching obviously depends on the didactic talent of the teacher and his/her approach to use of ICT at school. It goes without saying that if the students operate the computer themselves, the work is much more effective and interesting for them than if the computer is only used by the teacher.

With regard to teaching methods computer is applied to presentations of teaching programs with which the pupil then works independently or under the teacher´s guidance.

Survey at the Faculty of Business and Management

As the Faculty of Business and Management students will need mathematics and statistics for their future jobs a periodic survey has been organised among students of all grades with the aim to find out their approaches and views in relation to mathematics, statistics and computer technology.

The survey was performed in the form of a web-based questionnaire open to all day students of the Faculty of Business and Management, BUT in Brno. Subsequently 296 returned questionnaires were assessed. The questionnaire consisted of 31 questions. For the reason of input data verification and elimination of casual answers some questions were redundant. The students mostly answered questions with predefined answer variants to select from. There were also questions answered by selection from a scale pr by the simple Yes/No/I do not know. Some questions were open questions.

This article will only focus on the part of the answers concerning student views of direct use of computer technology in teaching.

The results are compared to results of a similar survey carried out in the years 2004 and 2007 at the same faculty. In 2004 the total number of returned and assessed questionnaires was 160 and in 2007 199 questionnaires were evaluated.

Personality of Student of the Faculty of Business and Management, BUT

The addressed 296 students included 209 males and 87 females. 58% of the students were secondary technical school or grammar school graduates, 20% of them were graduates from bachelor courses in economics. 65% of the students earned their living in the course of their studies by part-time jobs, even though only 25% stated that they worked regularly. When distinguishing between students of the individual grades there were substantial differences between first-year students and the other students. Only 16% of first-year students worked regularly. Students of the Faculty of Business and Management BUT saw their future as work with a small company, which was a considerable difference in comparison to earlier surveys where the students preferred establishment of their own company or work with a large company.

General Relation to Mathematics and Statistics

A pronouncedly negative approach to mathematics and statistics was expressed by only a small number of the respondents (maths - 5%, statistics - 4%). It is worth mentioning that a clearly neutral approach to statistics was expressed by most students (41% of the students mentioned a neutral approach, and 58% a rather positive approach), while many of them showed a prevailingly positive approach to maths (38% students mentioned a positive approach, and 22% a rather positive approach). The students considered teaching of maths important, which was also supported by the fact that they thought their utilisation of mathematical and statistical knowledge in their future practice would not be negligible. The correlation coefficient between the answers to the question about the relation to mathematics and statistics was 0.25. The correlation coefficient between the answers to the question about the relation to mathematics and computer technology was 0.13, and 0.15 for statistics in relation to computer technology. The total of 20.9% students mentioned a positive approach to mathematics and statistics as well as to computer technology. Strangely enough, some students (4.4%) stated a negative approach to mathematics but a positive approach to computer technology.

Personal relation of students to mathematics mildly fluctuates in time. In 2004 19% of the students expressed a negative or rather negative approach to maths, while in 2007 it was 22% and in the present survey it was 16%. Neutral perception of maths in the years 2004 and 2007 was expressed by 22% of the students, while in 2010 it was 24%. The students´ approach to statistics strongly fluctuates in time. While in 2004 the negative approach was expressed by 13% of the students, in 2007 it was 22% and in 2010 15%.

Figure 1: General Relation to Mathematics (Source: Own processing)

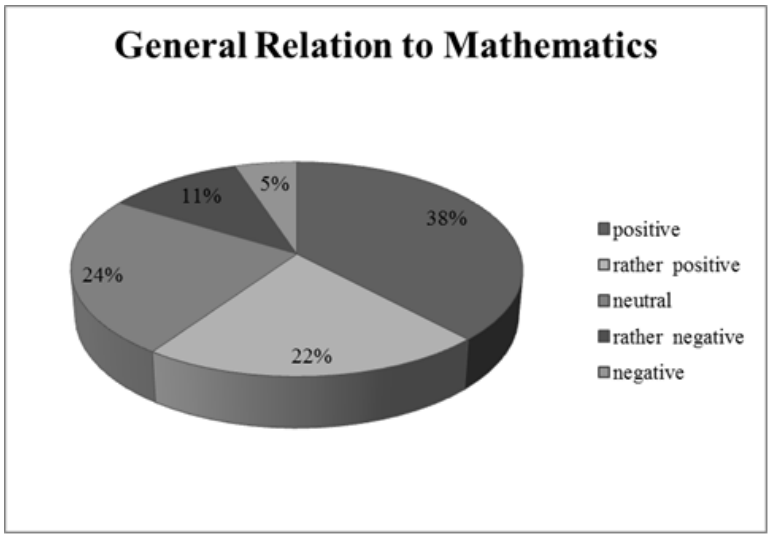
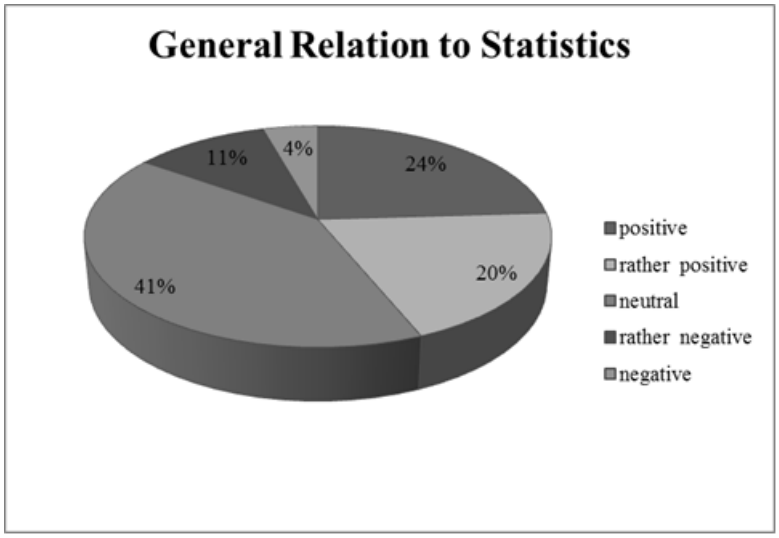


Figure 2: General Relation to Statistics (Source: Own processing



Relationship to Computer Technology

Students taking part in the survey mostly (58.8% of the respondents) had already used computer technology at the secondary school. Mere 10.5% of them stated that they had not used computer technology at the secondary school at all. The students were mostly satisfied with teaching of informatics at the university as for quality and scope, absolutely dissatisfied were only 2% of the respondents. Most of them assessed their software knowledge as user-level, but prevailingly advanced. 10.1% of the students surprisingly admitted computer illiteracy. The students assessed their HW knowledge as minimum or basic, which may be explained by their user approach to computer technology. Despite that the personal relationship of the Faculty of Business and Management students to computer technology was prevailingly positive. Except for mere 0.7% of the students all of them had a computer at home, and only 4% of them stated that the computer they used for work belonged to and was used by the whole family. Most students thus had a computer for their own personal need (95.3% of the students).

Like in the case of maths and statistics there was also a change in the relationship of students to computer technology. The number of students with a pronouncedly positive approach increased in time: in 2010 a positive approach to computer

technology was stated by 73% of the students, which was a significant increase from 2007, when this was only stated by 61%, and even more from 2004, when it was only 48%. Nevertheless, like in the previous years, there were also students with a pronouncedly negative approach (2% in 2010), while in 2004 there had been no such case.

Utilisation of Computer Technology and Statistics

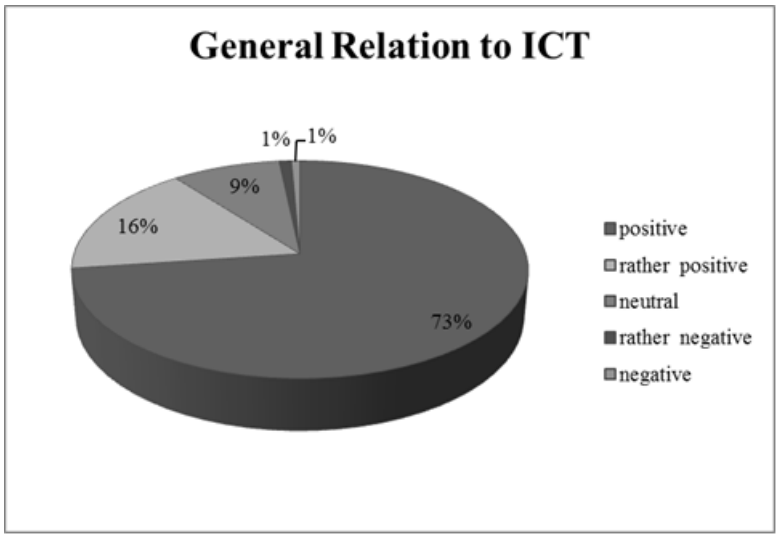
Economic profile disciplines taught at the faculty provide enough options for selection of themes and preparation of the final bachelor and master theses. The recent trend has been that when selecting a theme and the supervisor of their final thesis some students decide for analysing and addressing economic issues of a particular enterprise with the very mathematical methods and a suitable software system. 27% of the students planned to use statistics in their diploma theses and 39% assumed the need of processing large data sets. These were mostly students with independent logical thinking, creativeness, inventiveness and a positive approach to maths. There is yet another fact that cannot be neglected and that is that this trend is conditioned by the possibility to use a suitable computer environment and to effectively utilise the available time.

Utilisation of knowledge of statistics in future was considered not negligible by 68% of the students, and 19.3% of the students even assumed substantial utilisation. The students could imagine using specialized statistical software (49%), or at least considered this manageable (23%), 6% of the students already actively used such software. What is alarming, though, is the fact that 21.6% of the students checked the answer that use of specialised software was unimaginable for them. Despite that only 22.3% of the students would select a subject dealing with specialised statistical software to add to their curricula. 7.8% of the students even explicitly denied the possibility to select such a subject if it was available.

The students could provide free answers to the question about their knowledge of the software for statistical calculations. 32% of them did not answer the question at all, or answered that they did not now any such software. 31% of them mentioned MS Excel, 6.8% programs like Statgraphic, Maple, Matlab. The students stated to mostly use MS Excel (30 % oft eh students) and Maple for statistical calculations in practice.

As for the changes of the student opinions in time, it must also be stated that a considerably small number of students could imagine work with a specialised program. While in 2004 it was mere 3%, in 2007 it was 19% and in the recent survey in 2010 it was already 22%..

Figure 3: General Relation to ICT (Source: Own processing)



Conclusion

Students of the Faculty of Business and Management, BUT in Brno consider knowledge of mathematics and statistics necessary for their future jobs, but still this area is somewhat detached for them. They take use of computer technology for granted and consider themselves advanced users. Despite that they would hesitate to engage in work with specialised statistical software. This may be explained by little utilisation of computer technology in mathematics and statistics teaching.

The very positive approach to computer technology and the welcoming even though not warm relationship to mathematics and statistics studies should become future guide for extension of the curriculum by work with specialised software in practical lessons and transfer of at least part of the teaching to specially equipped computer classrooms.

Use of ICT, mathematical and statistical methods may be focused on their application to solutions of complex problems not only within the subject studied, which would contribute to the development of creative approaches and overall improvement of student creativity.

Computer will not think for us, the problem solving will always be controlled by the human user. When using the different software you should not focus on how the computer computes the task but on what is computed and how to correctly interpret the results of the computation. It is true that some traditional skills are suppressed by use of computers and cease to exist, but other skills emerge and develop at the same time. Mathematics as any other discipline develops too and therefore a shift in relevance of different procedures and methods is natural. Thanks to cognitive technologies we are today able to resolve tasks which a couple of years ago were insolvable or hard to resolve by traditional methods.

Therefore at present the teachers and the pupils change their roles in the teaching and learning process including mathematics. The general trend of the change leads to

- student-oriented teaching,
- teacher preparing to students authentic mathematical experiences and
- students tending to develop their own learning skills

At present a large number of employees within the European Union use computer at work – even in our country it would be hard to find an employee with a passed secondary school-leaving examination not needing to use computer at work. E-learning is now an inseparable part of human education in information society and considerably increases chances of graduates at the job market.

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Is the EHEA Evaluation criteria optimum? Empirical evidence from Finland and Spain

María-del-Mar Camacho-Miñano, Cristina del Campo, David Pascual Ezama, Carlos Rivero, Elena Urquia Grande & Murat Akpinar

Abstract

The Universidad Complutense de Madrid (Spain) and the Jyväskylä University of Applied Sciences (Finland) have experience on applying new teaching methodologies so that students can acquire a significant and deep learning through creative teaching. A new characteristic of this active teaching methodology is the student cumulative activities assessment. The aim of this paper is to show if there is any difference between the new assessment methodology compared to the traditional one and to know what factors could affect to students' outcomes. A survey and grades of first year students in the Statistics and Accounting subjects in the Business Administration Bachelor Degree taught in English during the academic year 2010-2011 are used applying multivariate statistical techniques. The most interesting results are that coursework is higher than the examinations ones, except for male students enrolled in statistics and that university's assessment culture, gender and course have impact on the academic outcomes.

Keywords

Active learning, assessment, coursework

Introduction

In the twenty-first century the university environment has been constantly changing in response to globalisation, a clear internationalization trend and changes in society´s expectations, resulting in the need of to redefine university strategies. Access and participation rates have raised significantly, graduates employability has become a crucial concern, and internationalization and life-long learning have become essential. In Europe, with the European Higher Education Area (EHEA) there has been a shift towards a student-centered learning approach. This has led to an improvement in education and presented a cultural challenge shifting from traditional teaching methodologies to active ones. However, these changes are being difficult to implement as new creative teaching methodologies require higher human resource development, more research in education, new classroom infrastructures, new quality assessment systems and smaller student-teacher ratios. All of these changes mean more investment in higher education.

Taking into account all of these changes, the teaching experiences of some lecturers evidence the concern about one basic issue in the process of students' learning: the assessment of that learning. Currently universities publish subjects' syllabus or contents of the subjects that are adapted to active learning methodologies and schedules adapted to the European Credit Transfer System (ECTS) in order for all universities belonging to the EHEA to have comprehensive and homogeneous degrees. However, in most of the cases, assessment homogenization has not been achieved yet. Assessment has been defined as 'the process of evidencing and evaluating the extent to which a candidate has met or made progress towards the assessment criteria' (Cox, Schleyer, Johnson, Eaton & Reynolds, 2008, p. 34). As Hand, Sanderson & O'Neil (1996, p. 105) explains "assessment is seen as a cost driver" due to the implication of academic staff in this process. At the same time, assessment is valued as a major influence upon the quality of the learning process (Gibbs, 1992). Therefore, assessment is a strategic matter for universities today and should serve multiple purposes such as providing information about student learning, student progress, teaching quality, and program and institutional accountability (Fletcher, Meyer, Anderson, Johnston & Rees, 2012).

With the EHEA environment, assessment criteria have shifted to a more holistic system embodying both the student´s daily effort and the final examination. Therefore, following active methodologies, the final grade of a subject is the weighted mean between the coursework and the final examination marks. Formal examination refers to closed-book time-constrained written essay, test or exercises, very similar to the traditional format of assessment. Coursework refers to alternative assessment of different activities the student must perform including work in group essays, oral presentations, simulations, etc. The logical hypothesis is that students with higher grades in coursework will have the highest grades in the final exams. This is because they are studying in a continuous way, they are engaged in their learning and they have done much more practice, enhancing the real understanding of the subject. However, empirical studies show that coursework grades are higher than the final exam (see, for example, Yorke, Cooper & Fox, 1996; Tian, 2007).

Two universities from Spain and Finland, the Universidad Complutense de Madrid (UCM) and the Jyväskylä University of Applied Science (JAMK), respectively, have experience on cooperation among teachers of Statistics and Accounting in exchanging experiences on applying new teaching methodologies. Moreover, Finland is one of the outstanding countries in European education (Grek, 2009) and an example to follow for other continental countries such as Spain, a country with a poor performance in the PISA reports (Calo-Blanco & Villar, 2010).

Bearing all these things in mind, the objective of this paper is twofold: first, to analyse the comparison of coursework and final examination results in two subjects of the Business and Administration Degree between Finland and Spain in order to test if there are differences; second, whether there are different factors (such as gender, age, subject, students' motivation and preferences) that have an impact on the assessment among students from the two countries.

The contributions of this paper are two: on one hand that the coursework mark is higher than final examination but not for all the students and on the other, that there are differences in Finland and Spain, depending on the assessment culture, gender and course. Moreover, this study highlights important implications for managers, teachers and students on assessment criteria.

The paper is organized as follows: firstly a literature review is offered on the role of assessment in the learning process, focusing more precisely on the coursework and examination discussion. Secondly, we describe the academic context in which this study took place, the sample selection and the methodology used. Finally, we offer the results and discussion about the hypothesis proposed, followed by the conclusions and pedagogical implications.

Assessment in higher education

The role of assessment in the learning process has been a topic of discussion in the educational

community around the world, during the last decade (Yorke, Bridges & Woolf, 2000; Gibbs & Simpson, 2004-05; James & Fleming, 2004; Baeten, Dochi & Struyven, 2008; Garside, Nhemachena, Williams & Topping, 2009; Fletcher et al, 2012). However, only little assessment research has been done and published in non-Anglo Saxon education environmental (Aliaga & Orellana, 1999).

Nowadays, the active learning methodology is the one applied in the majority of EU Higher Education Institutions. However, this methodology should always go together with a modern and dynamic assessment system that reinforces the teacher's methodology and motivates the student in the learning process (Hand et al., 1996). The traditional learning process had a teacher-centered focus where the lectures were given without any student participation, and the final exam was exclusively about the contents of the lectures and accounted for 100% of the final grade.

In parallel with the teaching methodologies, there are new teaching tools used as an aid in higher education such as simulations, problem-based learning, project-based learning, multimedia materials, etc. Consequently, all the elements of the learning process, syllabus, methodology, resources and also assessment criteria may be readjusted. In fact, the EHEA has integrated some of these aspects of the higher education with the implementation of the European Credit Transfer System (ECTS) but not others like grading systems, and this is a requirement in order to obtain real homogeneous systems (Karran, 2005; Yorke, 2010, 2011).

However, there are some problems related to assessment criteria in higher education. Firstly, assessment should not be a separate activity at the end of the course, but it has to be integrated in learning process (Tynjälä, 1998 Segers, Dochy & Cascallar, 2003). But it is not easy to find the way for the right type of assessment to be implemented. For example, there is evidence showing that some students who have knowledge cannot use it to solve complex problems of daily working life (Tynjälä, 1998; Dochy, Segers, Van den Bossche, & Struyven, 2005). Traditionally only the final exam had been used as a final grade focusing mainly on content knowledge. However, there is a general recognition of the negative or limiting impact of exams on the students' learning process (Muldoon, 2012). Currently, final grade is a weighted mean between coursework and final exam mark, and the skills developed by each subject are essential. The impact of this change on the students' academic outcomes is our concrete concern and that is our research focus. A majority of authors confirm coursework grades are higher than the final exam (Yorke et al., 1996; Dalziel, 1998; Bridges, Cooper, Evanson, Haines, Jenkins, Scurry, Woolf & Yorke, 2002; Yorke et al. 2000; Simonite, 2003; James & Fleming, 2005; Gibbs & Simpson, 2004-05, Murdan, 2005; Downs, 2006; Tian, 2007), but it is observed that it depends on the subject whether the difference between coursework and final exams is higher or lower. In quantitative subjects the coursework marks are significantly higher than final exam ones, whereas in qualitative subjects the difference between coursework and final exam is lower (Bridges et al., 2002; Simonite, 2003; Murdan, 2005). Other authors defend the belief that the "deep learning" approach is acquired with coursework evaluation whereas the "surface learning" approach is acquired with only final exams (Tian, 2007). In general, there are some motives to justify the differences between coursework and examination, but the results are not conclusive (Payne & Brown, 2011). With respect to the results of the assessment, there is empirical evidence that different types of assessment have an impact on students' learning and academic outcomes (Tynjälä, 1998; Gibbs & Simpson, 2004-05).

In previous studies have been found that students preferred permanent evaluation to participation in exams (Furnham et al., 2011) but that they were rather neutral towards new modes of assessment. On one hand, there are differences in assessment culture (Baeten et al., 2008) that should be researched. Another problem is that there are a variety of alternative ways of assessments: portfolios, self-evaluation, peers-evaluation, etc. (Sanders, 2010), but it is not sure whether all of them work to measure learning in the same way. Besides, the introduction of assessment options benefits an enhanced student-centered approach (Lai, 2010) although not all the studies show benefits

empirically (Garside et al., 2009). In fact, it has a negative starting point: it is a very time-consuming activity for teachers (Craddock & Mathias, 2009).

Finally, there are studies that show evidence of differences in students' preferences according to age and gender (Kniveton, 1996). Many studies show that half of students' grade measurement is continuous assessment. It is essential to highlight that assessment has a very important impact on students' behaviour and, consequently, on learning outcomes (Smith, 2011). For example, Michael (1991) argues that assessment is the only powerful variable available to the teacher to maintain class attendance and study. There is also empirical evidence that when students really know the assessment criteria, they perform better (Payne & Brown, 2011). This can be also be due to the students' perception that doing well is visible in the short term while learning well is only visible in the long term (Smith, 2011).

Research questions and hypotheses

Based on the previous section, the research presented here aims to provide answers to the following questions:

Research Question 1 (RQ1): Is there any difference between coursework and examination marks between Spain and Finland?

Hypothesis 1 (H1): Coursework marks are higher than examination marks both in Spain and Finland.

Research Question 2 (RQ2): What factors (e.g. gender, age, subject, students' motivation and preferences) impact on the Spanish and Finish students' assessment?

Hypothesis 2 (H2): The same factors have an impact on the assessment of the Spanish and Finnish students.

Sample data and research methodology

Sample data

The participants were 117 freshmen enrolled on the Statistics and Financial Accounting subjects in the Business Administration undergraduate degree, taught in English. 61 students were enrolled at the Universidad Complutense de Madrid (Madrid, Spain) and 56 students at the JAMK University of Applied Science (Jyvaskyla, Finland) in the academic year 2010-2011. 46% of the respondents were male and 40% female with distribution by university as it appears in Table 1.

Table 1: Gender distribution of respondents (%)

	UCM	JAMK
Male	41	52
Female	43	38
No answer	16	11

The sample is almost homogeneous because most of the questions on the survey give similar values, but there is a great difference in their working status. While the majority of students in JAMK are working (77%), in UCM it is the other way round (33%) as Table 2 shows.

Table 2: Working distribution of respondents (%)

	UCM	JAMK
Not working	48	13
Working	33	77
No answer	20	11

Methodology

The research variable analyzed is the final grade obtained by the already mentioned 117 freshmen enrolled on the Statistics and/or Financial Accounting subjects in the Business Administration Degree in the academic year 2010-2011. Grades range from 0 to 10, where 0 means the worst possible result and 10 the best one. The grades are divided into two intervals: grades in [0, 5) mean failure and grades in [5, 10] mean success, improving as they approach 10. With the Bologna methodology the final exam is not the only component of the final grade. In fact the final exam (FE), invigilated closed-book time-constrained examination, has only a weight of 0.6 or 0.7 depending on the university (UCM or JAMK, respectively). The other part of the final grade, called coursework (CW), is composed of active participation, assignments (exercises, cases, real-world problems, etc.) and interim class tests (Heywood, 2000). Also the students have two opportunities in the year to sit for the final exam and pass the subject, while the coursework component is obtained during the lecturing period.

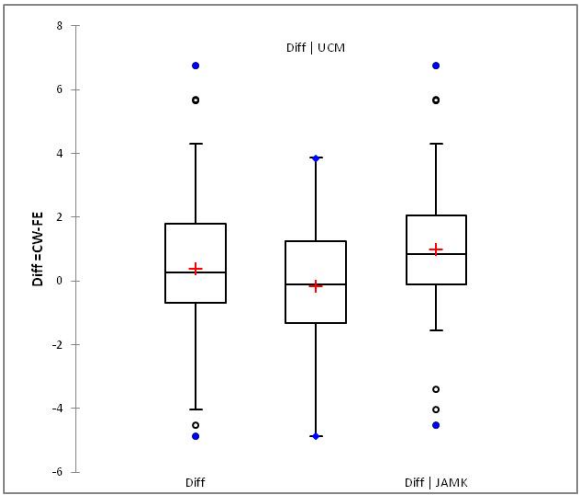
The students were asked to fill in a questionnaire of 20 items divided in three sections: demographic data (age, gender, nationality and working status), background data (university access exam grade, degree position in university application, previous knowledge of subjects or math score) and learning strategies (preferred ways of study, preferred type of evaluation, team working preferences).

111 students participated in the survey. Respondent rates are different depending on the question because not all of the students answered all the questions, but respondent rate is always bigger in JAMK. Those missing data were not considered and the analyses were run on existing data.

Results and findings

In order to check the first hypothesis, as it can be seen in the box plot (Figure 1), for a majority of the students (58%) the coursework mark (CW) is bigger than the Final exam mark (FE), although the difference (Diff = CW – FE) is bigger for JAMK students (mean and median bigger than cero) with smaller dispersion. Indeed, a variance analysis confirmed that those differences on the Diff variable are statistically significant.

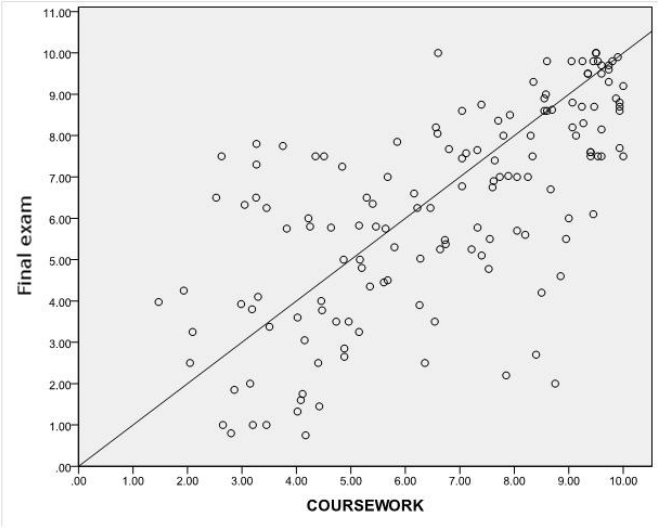
Figure 1: Diff variable box plots



The three distributions are quite symmetrical as the mean and the median are very similar with also the whiskers of similar length. The distribution for JAMK is a little right skewed, as can be seen from the length of the right whisker and from the fact that the mean is bigger than the median.

It can be also seen in Figure 2 that a majority of points are below the diagonal (CW = FE), meaning the coursework mark (CW) is higher than the Final exam mark (FE). In fact, 58% of the students have higher CW than FE, but percentages are quite different depending on the county: while in Spain only 47% students have higher CW than FE, in Finland the percentage increases to 74%.

Figure 2: Coursework mark against final examination mark scatterplot



Some descriptive statistics of the difference variable Diff = CW – FE are on Table 3.

Table 3: Descriptive statistics for Diff = CW - FE

		Statistic	Tip. Error
CW-FE	Mean	0,4342	0,16279
	95% Confidence Interval for the mean	0,1125 0,756	
	5% trimmed mean	0,4376	
	Median	0,42	
	Variance	3,896	
	Std. Dev.	1,97373	
	Minimum	-4,88	
	Maximum	6,75	
	Range	11,63	
	Interquartile Range	2,38	
	Skewness	-0,02	0,2
	Kurtosis	0,851	0,397

Therefore CW – FE has a mean of 0.4342 with a 95% confidence interval of (0.1125, 0.7560), so in average variable Diff is significantly positive. What is more, the coursework mark (CW) is higher than the final examination (FE) mark between 0.1125 and 0.7560 points. But there is a great difference in the values of the difference regarding the universities, as in both the coursework and the final exam marks the values in JAMK are much bigger than in UCM, as it can be seen in Figures 3.a and 3.b.

Figure 3a: Coursework box plots by university

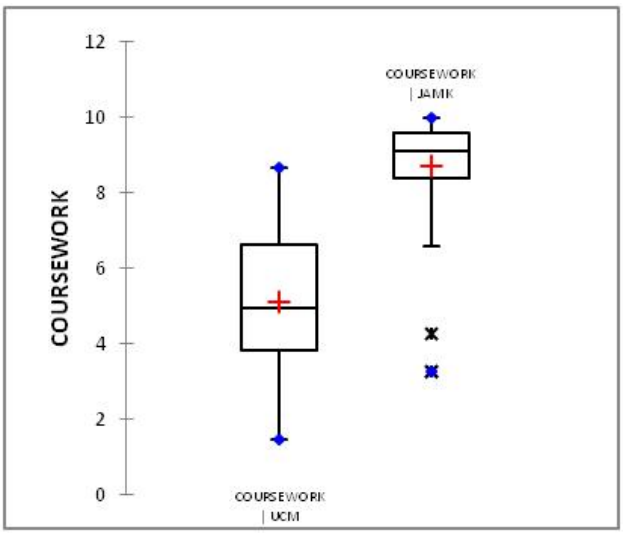
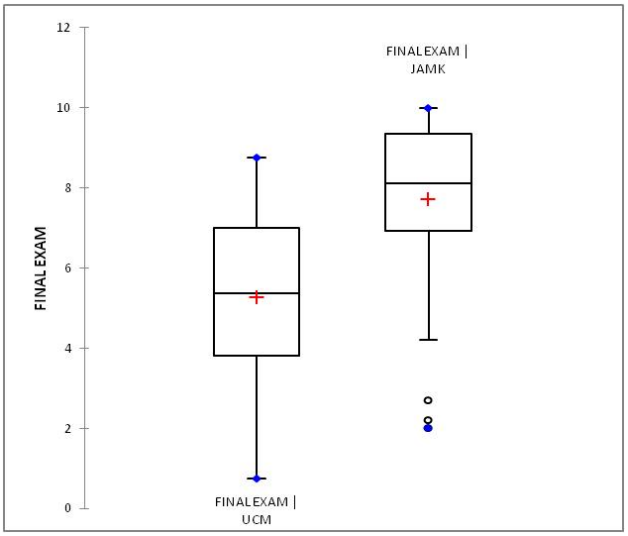


Figure 3b: Final exam box plots by university



If the subjects (Accounting and Statistics) are concerned, Statistics have, in average, higher values in both the coursework and final exam than in Accounting (mean and median are higher), but the difference is similar (see Figures 4.a, 4.b and 4.c.).

Figure 4a: Coursework box plots by subject

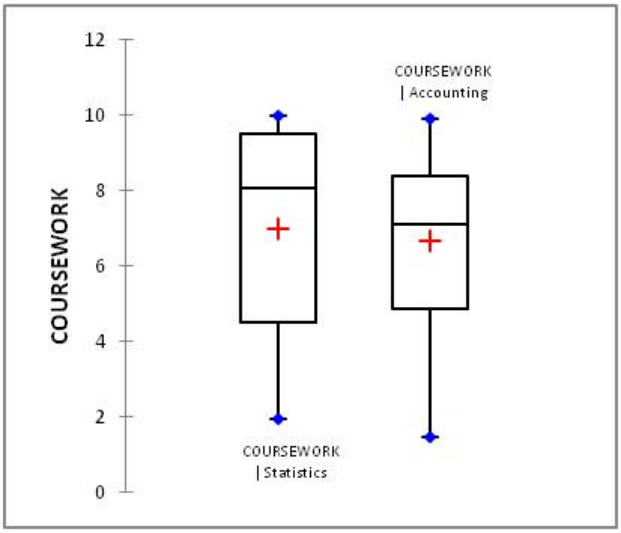


Figure 4b: Final exam box plots by subject

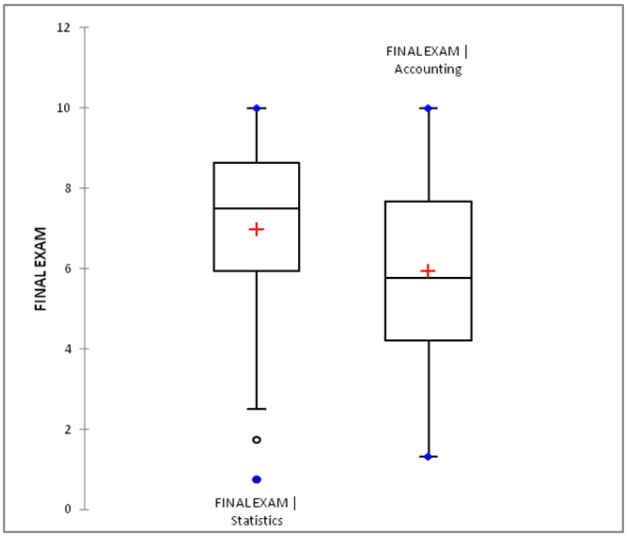
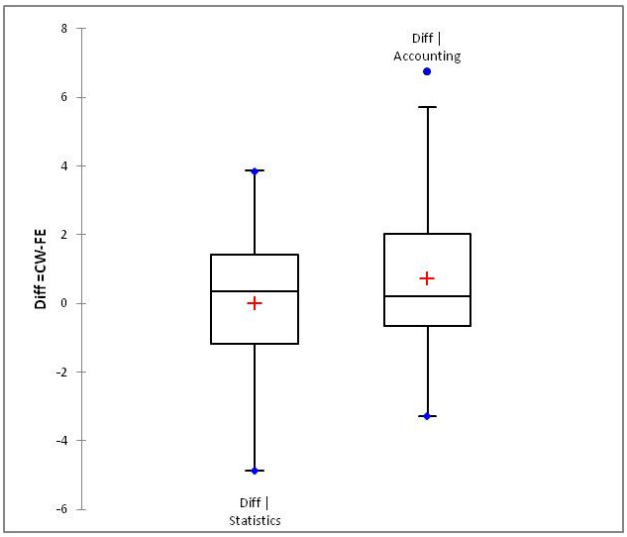


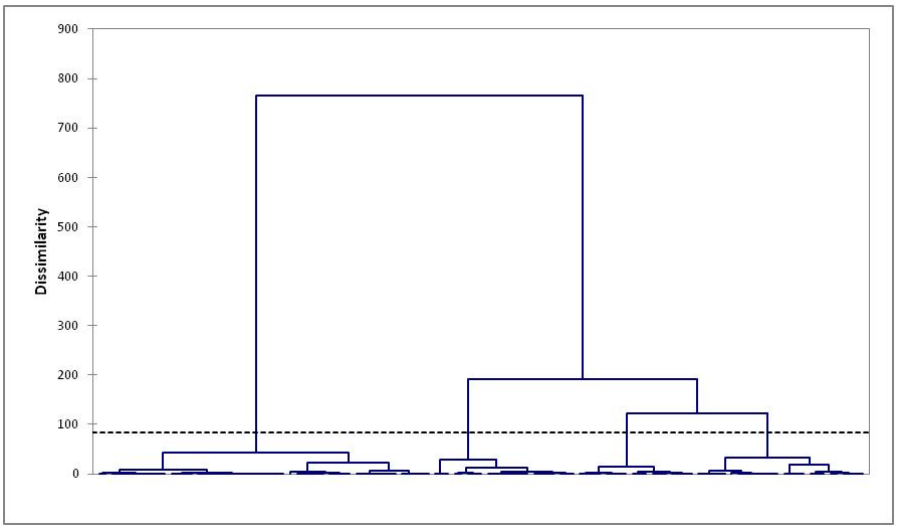
Figure 4c: Diff variable box plots by subject



In order to obtain more objective and significative behaviour patterns that consider every factor it is necessary to use multidimensional statistical methods and the best option is to proceed with a cluster analysis. The main objective of cluster analysis (Everit 1993) is to classify the different elements in a sample into groups (called clusters), so that each cluster's elements are as similar as possible between them but very different to other cluster's elements (homogeneity inside clusters and heterogeneity among them).

Using Ward's method with Euclidean distance, on Coursework and final exam marks, the following dendogram (see Figure 5) is obtained, where it can be clearly seen that four is the adequate number of clusters. Therefore the k-means clustering method is used to determine the four clusters.

Figure 5: Dendogram



In Table 4 it can be seen the number of students belonging to each cluster after k-means clustering was applied. There exists a bigger cluster (C4) including 42 students, one cluster not so large (C1 with 31 students) and two smaller clusters (C2 and C3) with just 24 and 20 students.

Table 4: Student distribution in clusters

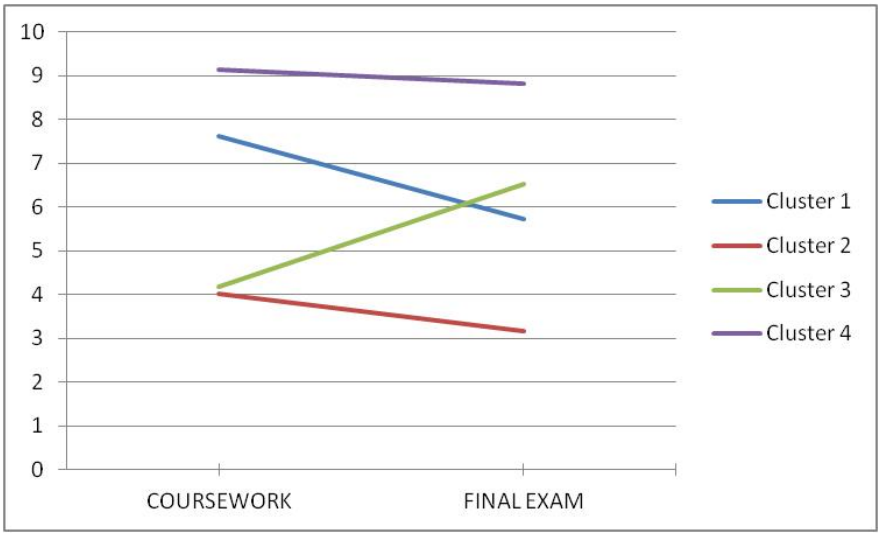
Class	1	2	3	4
Objects	31	24	20	42
Sum of weights	31	24	20	42
Within-class variance	3,091	2,896	1,758	1,403
Minimum distance to centroid	0,24	0,566	0,733	0,064
Average distance to centroid	1,506	1,551	1,243	1,067
Maximum distance to centroid	3,891	2,685	1,824	2,791

Table 5 has the values for each cluster's final centre, allowing us to establish the four patterns or typologies for the students. Those values can be more easily seen in Figure 6.

Table 5: Final cluster centroids

Class	Coursework	Final Exam	Sum of weights	Within-class variance
1	7,63	5,727	31	3,091
2	4,025	3,151	24	2,896
3	4,169	6,529	20	1,758
4	9,128	8,818	42	1,403

Figure 6: Cluster's final centre values



It can be seen (Figure 7a, 7b, 7c and 7d) that the clusters are very different from each other. Indeed, for cluster 1 (C1) and cluster 2 (C2) coursework mark is bigger than final exam mark, but that difference is higher in C1 so they all pass the subject, while in C2 they do not pass the subject. However, the relation is the other way around for elements in cluster 3 (C3), so the difference is negative (see Figure 7c) but they mostly pass the subject. And finally, both coursework mark and final exam mark are very similar and high in the case of cluster 4 (C4), therefore the difference is around zero, and final grade is the best.

Figure 7a: Coursework box plots by cluster

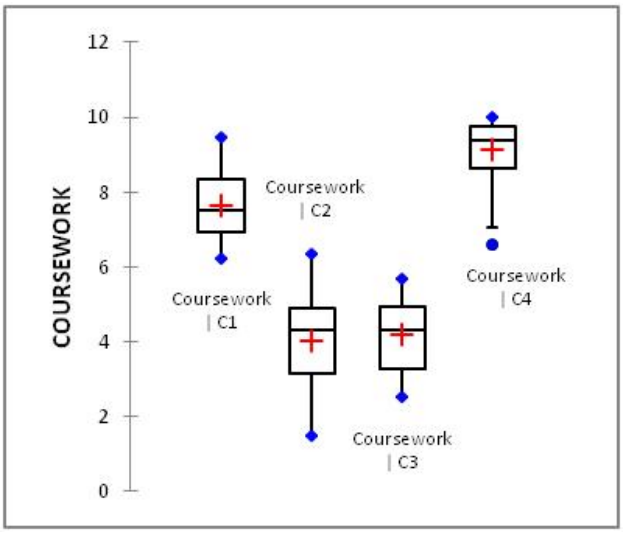


Figure 7b: Final exam box plots by cluster

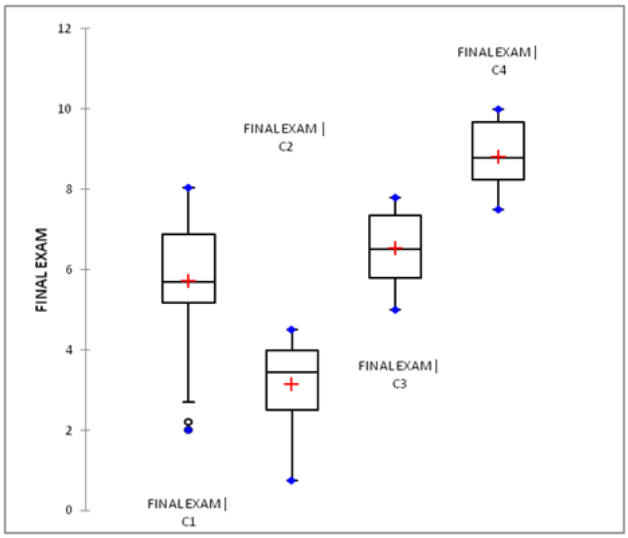


Figure 7c: Diff variable box plots by course

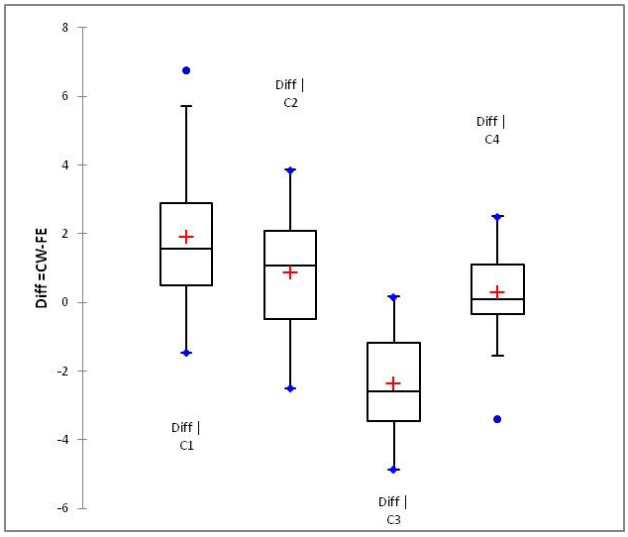


Figure 7d: Final grade box plots by course

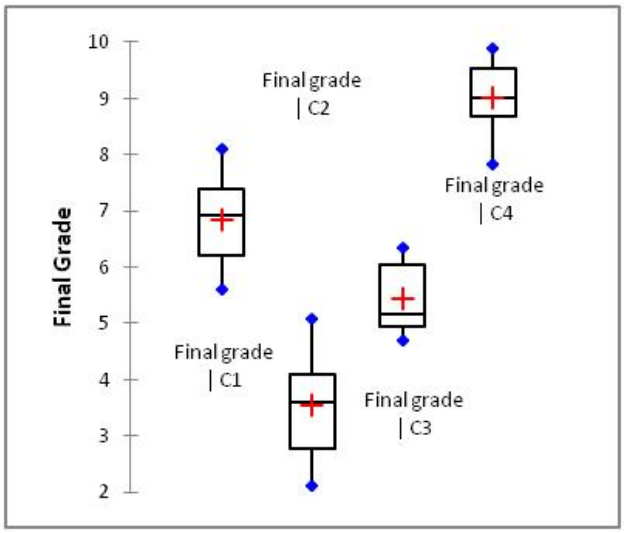


Figure 8a and 8b show the gender and subject distribution by cluster. C3 is mainly male, while gender distribution is more similar, despite the differences, in the other three clusters (C1, C2 and C4). C1 and C2 are mainly Accounting, while C3 and C4 are mostly Statistics.

Figure 8a: Gender distribution (%) by cluster

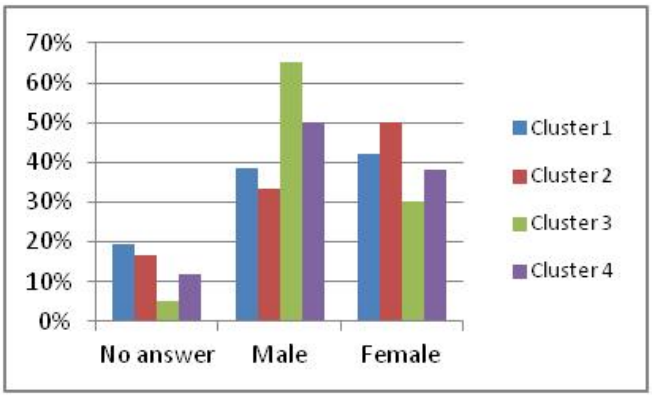
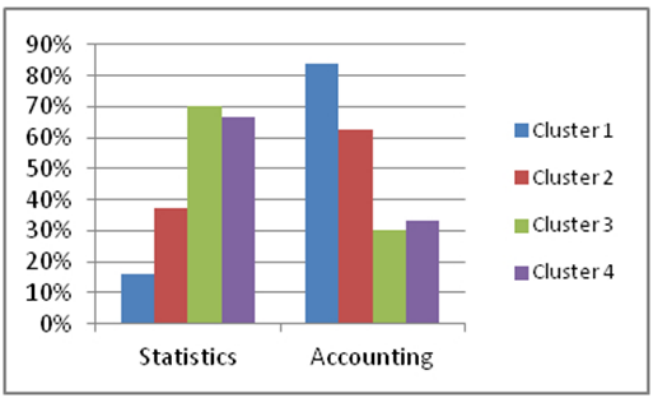


Figure 8b: Subject distribution (%) by cluster



In order to answer the second research question, regression and variance analyses were carried out on the grades and the answers to the questionnaire. The coursework (CW) and the final exams marks (FE), as well as the difference between them (Diff) were used as dependent variables whereas the other 16, three quantitative and twelve qualitative factors, coming from the questionnaire (final grade, number of calls, preferred evaluation type, University Access examination, Maths grade, gender, motive for electing the degree, degree position in the university application, type of lecturer, study method, learning style and team work preferences) were used as explanatory variables. All of them there were found not to have any type of influence on the coursework and final exam differences between the analyzed groups from Finland and Spain.

Discussion and conclusion

The aim of this paper was twofold: first, to analyse the comparison of coursework and final examination between Finland and Spain in order to test if there are differences in assessment methodologies; second, whether there are different factors (such as gender, age, subject, students' motivation and preferences) that have an impact on the assessment between students from the two countries. Our findings question the concept of assessment validity (Yorke et al., 2000) and the relationship between assessment and learning (Furnham et al., 2011). Firstly, coursework marks have resulted higher than the examination ones (Murdan, 2005), except for cluster 3: male/statistics. Moreover, there are some differences in gender in the same way as Woodfield, Earl-Novell and Solomon (2005) and in course in line with Simonite (2003).

In general in both universities and for both subjects learning was enhanced by student involvement in the learning activities and environments that were most directly related to the learning outcomes (Struyen, Dochy, Janssens, Schelfhout & Gielen, 2008).

Secondly, there are differences in Finland and Spain depending on the university's assessment culture, gender and course. Those differences may be due to cultural factors (Baeten et al., 2008). Another explanation could be that Spanish teachers are not assessing in a right way the skills and competences defined to be assessed in each coursework because of less experience in active learning methodologies.

In general, a teacher debate in assessment should be opened between both universities in order to discuss more creativity in the ways to assess learning outcomes. A proposal could be to mix the variety of evaluation methods (portfolios, quizzes, long and short exercises, problem based learning, etc.) in order to balance out non-systematic errors and avoid subjectivity. Another proposal may be to make an initial contract with the students who could choose the way of assessment depending on their preferences or learning strategies.

This study is not without limitations. The sample size is small and the analyses are focused only in two subjects and only two countries. More studies in this line are needed to generalize our findings. Our future research lines will be to amplify the sample with more students, more subjects and more countries in order to contrast our results. Moreover, it could be interesting to analyse the characteristics of students according to their clusters or to test different ways of assessment.

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Learning through cooperation and competition

Murat Akpinar, Cristina del Campo & Enes Eryarsoy

Abstract

In this study, we look into the effects of cooperation and competition on learning outcomes in three universities from Finland, Spain, and Turkey. Feedback was collected via online survey from students who participated in the monitored international group competition. Our results support positive impacts of cooperation on learning outcomes but deny any negative impacts of competition. We argue further that learning outcomes are also influenced by cultural differences in perceptions towards cooperation and competition. Overall, we find the international group project competition with analysis of real-life business problems a creative approach to stimulate enhanced learning for raising "intelligent consumers of business statistics".

Keywords

Learning, cooperation, competition

Introduction

Business statistics is a first-year basic course in the curricula of many bachelor degree programs in business administration. The course aims to develop students' skills in making meaningful analysis of large data sets and applying quantitative research methods to solve managerial problems. Due to its high level of involvement with large chunks of data and unfamiliar quantitative terms with mathematical formulas, this course is vulnerable to become a boring, number-crunching exercise for some students. In this situation, the resulting learning outcomes and performance are likely to be poor as students feel demotivated and at times frustrated in front of meaningless data sets. To avoid such instances, professors of business statistics should exhibit creativity to engage their students in order to achieve better learning outcomes and performance. Stimulating learning creatively is not a concern of business statistics professors only. It has always been a very important topic in education literature and a major issue for educators at all levels of primary, secondary, and higher education (see Gibson 2010).

Creativity in the classroom involves the application of knowledge and skills, in new ways, to achieve valued outcomes (Burke 2007, 36). To better understand how to apply creativity in the classroom, we should consider what is learning and how it can be achieved. Learning is divided into two categories: explicit learning and implicit learning (see Jensen 2005). Explicit learning is achieved through activities such as reading textbooks, listening to lectures, seeing pictures and watching videos. Implicit learning, on the other hand, is achieved through life experience, games and other hands-on activities. Such learning is also called experiential learning (Dewey 1938, Kolb 1984). Experiential learning through meaningful activities increases students' engagement through real-world experience, optimized learning transfer, integrated theory

and practice, and a shift of learning responsibility to the students (Corner et al. 2006).

The proposition to involve students in meaningful activities to increase their levels of engagement is also rooted in activity theory (see Vygotsky 1978, Engeström et al. 1999). Students learn concepts best by doing – seeing, smelling, hearing, touching and tasting as well as thinking, either creatively or logically, so that learning is meaningful and practical (Burke 2007, 35). Such classroom activities include game simulations, problem-based learning exercises and case competitions (see Sachau and Naas 2010). Group work is encouraged in these activities in order to meet students' social needs and thus contribute to improvement of their learning outcomes and performance.

In this research a creative learning activity was developed with the aid of literature on learning jointly by the authors of this paper who all teach the course of business statistics in their respective universities in Finland, Spain and Turkey. In this activity students in each country formed groups of three, proposed project ideas to solve real-world managerial problems, collected relevant data, analyzed their data using descriptive statistics, and came up with practical suggestions to solve the problems. All groups reported their work and made 10-minute presentations in the classroom. All presentations were video-recorded, and the best three groups were selected in each university by individual professors using previously-developed common evaluation criteria. Altogether nine video recordings and reports (the best three from each of the three universities) were watched and read by the three professors, and the final best three were selected and their members were awarded with plaques. This activity involved both competition (between groups) and cooperation (within groups).

Earlier research indicates mostly positive, but also negative results, about the effects of cooperation on learning outcomes and performance (see Orlitzky and Benjamin 2003, Griffin et al. 2004, Krause and Stark 2010). The effects of competition on students' learning outcomes and performance are mostly negative (see Wang and Yang 2003, Lam et al. 2004). This research aims to contribute to better understanding the impacts of cooperation and competition on learning outcomes and performance. We also think that it is interesting to analyze whether the effects of cooperation and competition on learning outcomes and performance differ in different cultural contexts. To research these subjects a group project competition was developed, embedded into and implemented during business statistics courses at the home universities of the authors in Finland, Spain and Turkey. Following that a survey was conducted with all students who participated in this group project competition at the three universities, and results were analyzed.

The paper continues with literature review and derivation of hypotheses. This is followed by description of the project and applied methodology. Results are presented after methodology, and then they are discussed and avenues for future research are suggested in the conclusions section. Finally, the paper ends with an executive summary.

Literature review

Although it is known that individual intelligence accounts for almost half of individual learning (Bacanu et al. 2000), there is still large room for professors to facilitate learning processes. In this section we first review of some of the theories of learning. These theories help us in developing our activity. Later we review literature that looks at the impacts of cooperation and competition on learning and build our hypotheses for achieving more enhanced learning for our students through our activity.

Learning

Learning is a process which results in changes in behavior, and people have different learning styles (Kolb 1984). An interpretation of the first part of this sentence is that learners are expected to behave in 'learned ways' following the process of learning. In other words, they are not only passive absorbers of new knowledge but active appliers of acquired competencies. Learning theories differ based on their assumptions of the concept of knowledge and the concept of human being (Schön 1987). Knowledge is perceived as objective or subjective, and the human being is considered to be active or passive in these theories.

According to behaviorist learning theory (see Skinner 1974), the learner is a passive receiver of ready-made knowledge. Learning is about observable components of behaviors based on stimuli and responses. Teaching is conducted using examples followed by imitation of students (repeat after me). Teachers are task-oriented, and appropriate behavior is reinforced through instant feedback and rewards while students are provided with clear instructions and motivated through continuous assessment. In this approach good learning (which is conceived of as permanent understanding) is facilitated by teachers through linking knowledge with application, and focus is on analysis using critical approach.

According to cognitive learning theory (see Gagne et al. 1992), learning is about perception, problem solving, information processing and understanding. It assumes that the human being is a goal-oriented seeker and processor of information. It also assumes that knowledge can be modified or combined through information processing which results in new knowledge. The process of learning in this approach involves getting motivated, getting oriented, finding the appropriate research problem, understanding existing knowledge and creating new knowledge for solving the problem.

Finally, constructivist learning theory emerges from the assumption that knowledge is not independent of the learners' values and beliefs (see Dewey 1938). Cultural influences are important for the learning process since it is based on interaction with the social environment. According to this theory teachers should take into account previous knowledge as well social backgrounds of learners and plan and implement their methods by emphasizing social interaction. Differences in interpretations of learners are acknowledged as means to activate thinking and create discussion opportunities.

One kind of constructivist learning theory is experiential learning theory (see Kolb 1984). According to this theory, learners are again goal-oriented and actively seek, process, and assess information. Learning occurs through the process of action, experience, reflection, and theoretical analysis / conceptualization. This is a continuous loop, and the outcome is continuously increasing learning reflected between actions and conceptual thinking. A familiar learning approach under this theory is learning by doing. Learning by doing is a kind of trial-and-error learning through conducting meaningful activities. The activity is a mediator or facilitator of learning between the learner and the subject to be learned (Vygotsky 1978). This approach to learning is based on the assumptions that the brain rarely gets it right the first time, and making mistakes is key to developing understanding and learning. Error correction is the key act in this type of learning as it is through reflecting upon their errors that individuals learn. Group work is especially helpful in this approach as learners receive immediate feedback from their peers in the group and reflect upon their actions. This approach is considered to be an effective approach to learning reflected by the words of the Chinese philosopher, Confucius: "I hear and I forget. I see and I remember. I do and I understand".

However, no matter which learning theory or approach is applied there are basic principles which facilitate better learning (Jordan et al. 2008). These are motivation, orientation, assimilation/accommodation, experimentation, and assessment. These principles follow a sequence and should be applied by teachers during the learning process.

First, students need to be motivated. There are a number of theories on human motivation (see Russell 2008 for a broader review). Early theories point out needs as key motivation factors for human beings. Maslow (1943) provides a hierarchy of needs and argues that motivation for higher level needs depends on whether lower level needs are satisfied or not. According to the two-factor theory of motivation (see Herzberg 1968), whereas hygiene factors (basic factors to provide a good work environment) prevent dissatisfaction, factors like achievement, recognition, responsibility, and promotion motivate. There can be extrinsic motivators such as rewards or punishments, and there can also be intrinsic motivators such as self-esteem, own initiative, and self-direction. Human beings are classified as lazy and work shy (Theory X) or self-directed and committed (Theory Y) (McGregor 1960). People of Theory X have external locus of control and need extrinsic motivators. They try to

avoid responsibility as much as possible. People of Theory Y, on the other hand, have internal locus of control and possess intrinsic motivators. They are proactive, self-determined, and take responsibility. They take pride in success and feel shame in failure.

Later theories focus on causal attributions and relationships between goals, expectations and perceptions of ability. According to attribution theory (see Weiner 1985), people usually attribute success to own abilities and failure to uncontrollable external circumstances. According to this theory people are motivated to achieve if they have attributed past performances to their own efforts. According to expectancy theory (see Vroom 1964), motivation depends on anticipation of a reward, the importance of this reward, and the expectation of achieving this reward. Expectation of achievement is driven by self-esteem (perception of one's own worth) and self-efficacy (perception one's abilities). Self-efficacy is affected by past performances, vicarious experiences and persuasion by others. High self-esteem and self-efficacy increase one's persistence and increases chances of success. According to the ARCS model of motivational design (see Keller 1987), motivation comes through attending (A) to a task, understanding its relevance (R), being confident (C) on achieving the goals of the task, and getting satisfaction (S) from the task.

Orientation follows motivation. Orientation refers to the description of knowledge which will be learned and linking it to earlier knowledge of students. This is followed by assimilation and accommodation. During assimilation and accommodation students internalize new knowledge in that they interpret it and think about how they can use it. After that students should experiment. During experimentation, students externalize new knowledge in that they experience it by applying it in a context. Finally, during assessment students reflect upon new knowledge in the light of their experiences.

Cooperation and Learning

Sharing and debating ideas inside a group stimulates cooperative learning through reflective processes, and that might be superior to individual learning since nobody can have all the information required to put the pieces of a puzzle together (Cohen 1994). Cooperative learning occurs in a process whereby group members first enter into conflicts, and then they resolve them by co-creating a common understanding (Doise & Mugny 1984). In the group there will naturally be students of high and low intelligence, but all benefit in their learning. Low-intelligence students benefit as their peers help them, and high-intelligence students also benefit as they externalize their knowledge. Teachers, however, must pay attention to two conditions in order to achieve superior learning in groups (see Slavin 1983, Dembo & McAuliffe 1987, Lou et al. 2001). First, active participation of all group members should be encouraged. This is crucial in triggering cooperation and reflective processes. Second, in some groups some members (those of high-intelligence) may act in ways to dominate others in the group. Such acts may result in withdrawal of other learners from cooperation and thus hinder learning. This may especially happen in the course of statistics since some students lack confidence in their mathematical skills (Krause and Starke 2010). Krause and Starke (2010) indeed found out in their experiment that cooperative learning did not necessarily result in superior performance than individual learning in business statistics course.

Studies have looked into different factors that may influence team performance. Diversity of group members was suggested in some research to increase creativity and positively affect team performance (see Amabile 1989), whereas in other research it was also shown to possibly trigger negative affective reactions and withdrawal of some group members and affect team performance negatively (see Ely 1994, Maznewski 1994). Similar mixed results appear on the relationship of sex composition and group performance (see Ely and Thomas 2001, Orlitzky and Benjamin 2003). Small groups are expected to perform better when cooperation aims at reflection and elaboration rather than extensive discussion (Krause and Starke 2010).

Competition and Learning

In management literature competition is perceived as a positive factor that drives creativity and innovations thus competitiveness of a given location (Porter 2008). Porter (2008) differentiates between zero-sum competition

and positive-sum competition. Zero-sum competition occurs when one competitor wins at the expense of others. This destructive effect occurs since competitors imitate each other in their strategies, products and services that they pursue and offer. In positive-sum competition competitors differentiate themselves from each other in their products and services, and as a result, they all win.

Does competition among students motivate increased efforts and lead to improved learning? This question has been raised and studied in education literature, and effects of competition on learning outcomes and performance are perceived to be negative (Wang and Yang 2003). Competition shifts the focus from learning goals to performance goals (Ames & Ames 1984). Amabile (1989) argues that competition restricts choices and as a result can destroy creativity. Lam et al. (2004) found out that in times of competition students chose easy tasks rather than challenging ones, and that resulted in inferior learning. The negative impacts were more on less able students who knew that they would not be able to win (Vallerand et al. 1986). These students tend to lose interest in the task more easily since their attentions are focused on the end result instead of the process of the activity (Lam et al. 2004). Failure raises emotions of anxiety and being upset and affects students' self-esteem. Ames and Ames (1984) argue that these effects are more severe in competitive learning environments. In Finland, competition in the classroom is avoided in early years of education based on both cultural reasons and findings that it may have negative effects on individual performances during adulthood (Sahlberg 2011).

Hypotheses

This research targets to contribute to the literature on learning through analyzing the simultaneous impacts of cooperation and competition on learning outcomes and performance in a diverse cultural context. We think that the cultural aspect is interesting as perceptions towards cooperation and competition may differ from culture to culture and thus impact learning differently.

First based on literature review we believe that cooperation has a positive impact on learning, and this is reflected in Hypothesis 1.

Hypothesis 1: Cooperation among students leads to improved learning outcomes and performance.
Secondly, again following literature we argue that competition has a negative impact on learning, and this is reflected in Hypothesis 2.

Hypothesis 2: Competition among students results in poorer learning outcomes and performance.

Finally, we hypothesize that cultural perception of cooperation and competition impact on learning outcomes and performance. These are reflected in Hypotheses 3a and 3b.

Hypothesis 3a: Cultural perception of cooperation has an impact on learning outcomes and performance.

Hypothesis 3b: Cultural perception of competition has an impact on learning outcomes and performance.

Project description and methodology

The purpose of the group project is to help the students become intelligent consumers of statistics, that is to say, help them know how to do a "real-world" statistical analysis including the process of coming up with a relevant research question, obtaining and working with data, conducting descriptive analysis, and making conclusions based on their analysis.

In this project groups were formed of three students. There were total of 17 groups from Finland, 15 groups from Spain, and 17 groups from Turkey. Each group was required to write a project idea (1-2 paragraphs, 150-250 words) for the analysis of 5 to 10 variables. They could propose any relevant project related to Business/Management. Then they had to come up with a project from a certain point of view, with a clear objective and propose solutions as a result of their analysis.

At the end of the project each group had to produce a final project report (1200-2500 words). The report needed to include the project description, the description of the data (variables, measurement units, etc.), the process by which they had obtained their data set, all the computer outputs, interpretation of the results conducted on their data set using descriptive statistics and their conclusions.

Each group also had to present the report in a 10 minute exposition on an appointed date. The presentations were video recorded. Project reports along with presentation videos were assessed first by their respective course instructor. The top three groups were selected from each of the universities to be further evaluated by the international committee of three professors. Each of the professors came up with a ranking for the nine selected groups and a final ranking, aggregating the individual rankings, was obtained. The best three groups were selected and given plaques stating their outstanding performance.

An online survey was conducted with students in three countries after the presentations to study the students' impressions on the project. The survey questionnaire contained sections on demographic data, self-opinion on relations with others, opinion on project team in general, specific opinion about each member of project team, as well as the group project and competition. The questions in the survey were closed questions with a 1 to 5 Likert-type scale (Likert 1932) where 1 meant "completely disagree" and 5 meant "completely agree".

Results

119 students answered the questionnaire: 41 out of 47 from JAMK, all 45 from Sabanci, whereas 33 out of 45 from UCM.

Table 1: Gender distribution of respondents (%)

	JAMK	Sabanci	UCM	TOTAL
Female	61	51	52	55
Male	39	49	48	45

55% of respondents were female with distribution by university shown in Table 1. Gender percentages are very similar at Sabanci and UCM, but there is a higher female population at JAMK. There are, however, significant differences in age distributions between the universities (see Table 2). UCM students are younger with 75% being 18 or 19 years, while only 6% Sabanci and 24% JAMK students are less than 20 years.

Table 2: Age (years) distribution of respondents (%)

	JAMK	Sabanci	UCM
<16	0	2	0
17	2	2	0
18	7	0	33
19	15	2	42
20	15	18	9
21	17	31	9
22	12	29	3
23	7	9	0
24	0	4	0
25+	24	2	3

Hypothesis 1 argues that cooperation among students leads to improved learning outcomes and performance. Despite differences of perceptions, a majority of students in each university (especially UCM) took the project seriously and collaborated in good attitude towards accomplishment of the project (see Figure 1).

Figure 1: Group attitude towards the project

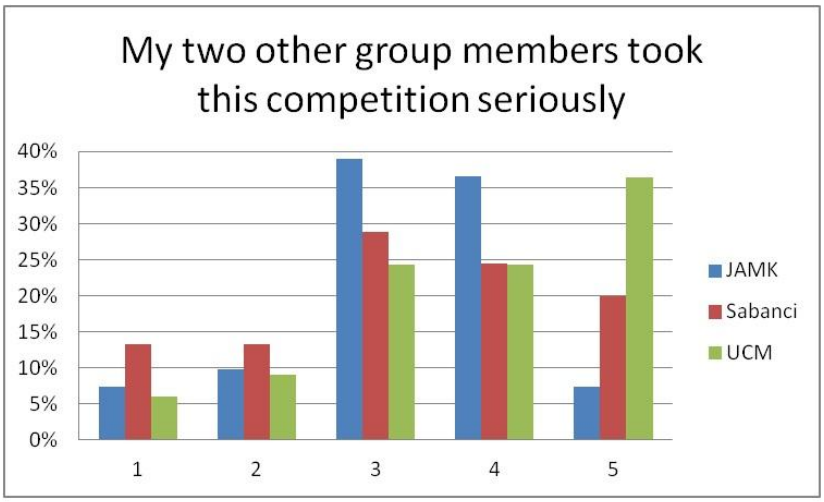

Figure 1. Group attitude towards the project.

The students, especially those at Sabanci and UCM, spared more time in this project compared to similar assignments in other courses (see Figure 2).

Figure 2: Time spent for the project

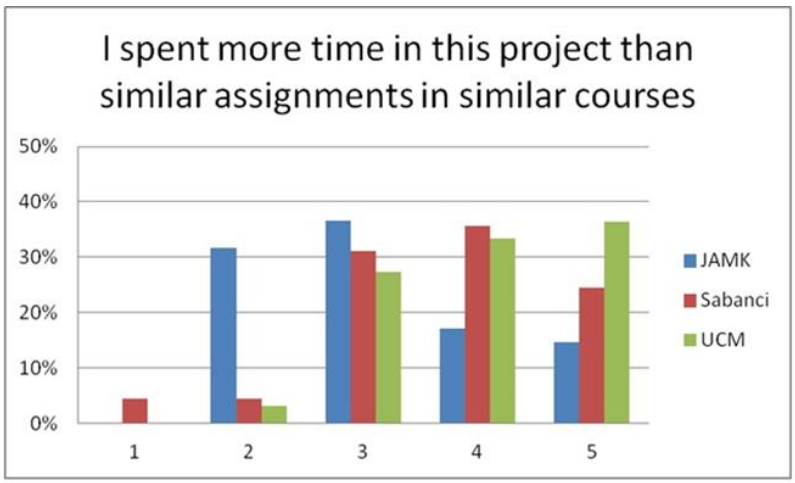

Figure 2. Time spent for the project.

As a result, a majority of students in each university believe that the project had a significant contribution to their learning (see Figure 3).

Figure 3: Contribution of the project to learning outcomes and performance

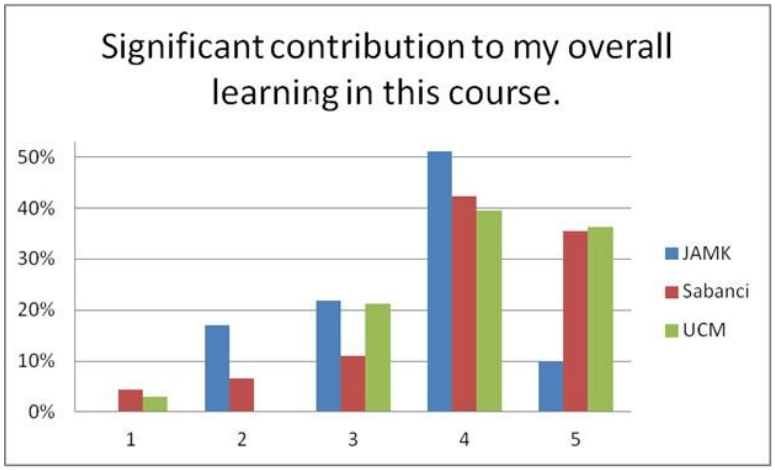

Figure 3. Contribution of the project to learning outcomes and performance.

Combining results from group attitude, time spent for the project, and contribution to learning outcomes, we can conclude that collaboration has a positive impact on learning, and thus *we accept Hypothesis 1.*

Hypothesis 2 argues that competition among students leads to poorer learning outcomes and performance. Except for JAMK students, the students in general said that the group competition increased their motivation (see Figure 4).

Figure 4: Increase in level of motivation

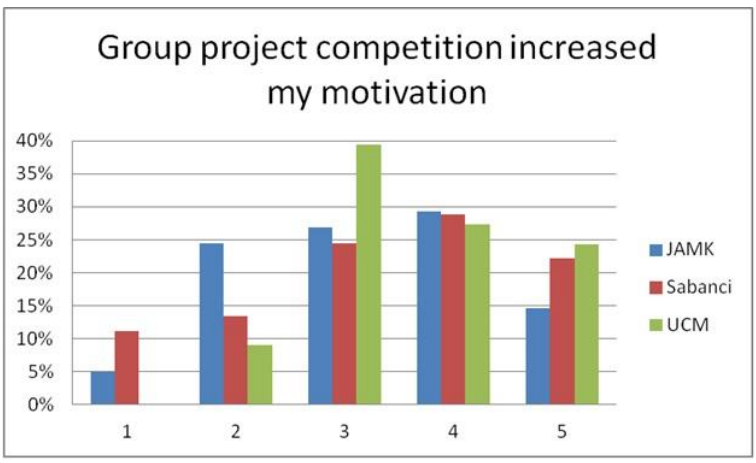

Figure 4. Increase in level of motivation.

A majority of students also disagreed that they had negative pressure due to competition (see Figure 5).

Figure 5: Negative pressure from competition

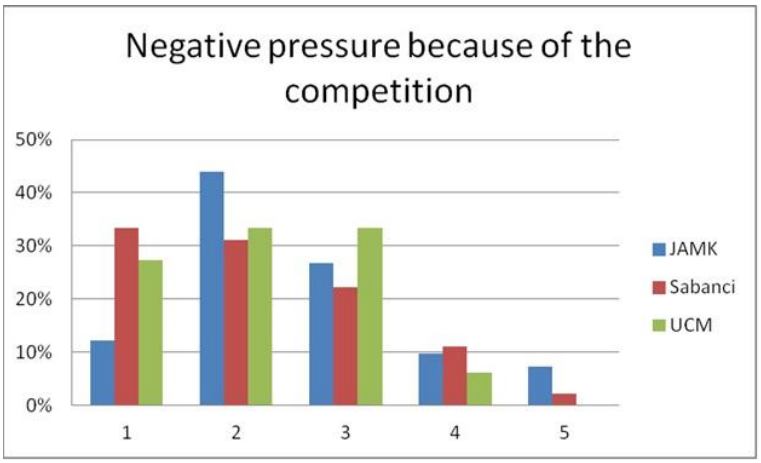

Figure 5. Negative pressure from competition.

In addition, a majority of students in every university like that their project was ranked internationally (see Figure 6).

Figure 6: Attitude towards international competition

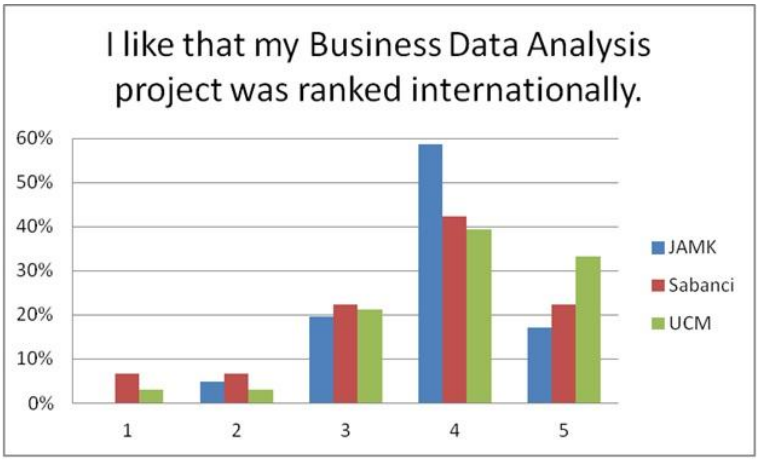

Figure 6. Attitude towards international competition.

Based on results from Figures 4, 5 and 6, *we reject Hypothesis 2*. On the contrary, we can suggest that international group level competition increases student motivation, and this may lead to improved learning outcomes and performance.

Finally, Hypothesis 3a argues that cultural perception of cooperation has an impact on learning outcomes and performance while Hypothesis 3b argues that cultural perception of competition has an impact on learning outcomes and performance. Looking at the graphs we are

not able to conclude with our results on acceptance or rejection of both hypothesis 3a and 3b, therefore statistical inference techniques will be applied.

Results for each Likert-type item may be analyzed separately or, in some cases, item responses may be summed to create a score for a group of items (this is why Likert-type scales are often called summative scales). There are many approaches available for statistical inference such as chi-squared test, Mann–Whitney test, Wilcoxon signed-rank test, or Kruskal–Wallis test (Cohen et al. 2000). As in our case we want to analyze responses to questions on competition and cooperation with university being the independent variable. We decided to analyze responses across the three groups (Jamk, Sabanci and UCM) of respondents using the Kruskal-Wallis test (Kruskal & Wallis 1952) at 0.05 significance-level. Kruskall-Wallis models provide the same type of results as an analysis of variance, but based on the ranks and not the means of the responses.

Results for the KruskaI-Wallis test were obtained using R (v. 2.1.5.) for each of the items individually (see Table 3).

Table 3: Kruskel-Wallis test results

Item	Kruskal-Wallis rank sum statistic	p-value
Competition		
Having an international competition for this course increased my level of concentration for this course	6,8724	0,03219
I like that my Business Data Analysis project were ranked internationally.	1,5948	0,4505
I like competitions.	4,9637	0,08359
I like competing as group	1,1671	0,5579
My two other group members took this competition seriously	4,568	0,1019
My two other group members thought that winning this competition was important	6,0328	0,04898
Students in my course take this competition seriously	0,3804	0,8268
Students in my course think that winning this competition is important	2,3167	0,314
I wanted to create an excellent project	17,2761	0,000177
I wanted to have our project be among the top groups	15,9405	0,000346
Our group intended to develop our project to be among the top groups	21,3006	2.369e-05
As a group, our intention was to create an excellent project	15,7979	0,000371
I felt negative pressure because of the competition	3,1071	0,2115
Total score competition	11,8422	0,002682
Cooperation		
I enjoy working as a team in a competition	2,509	0,2852
Group project competition increased my motivation	2,1625	0,3392
At the beginning, I believed that as a group we could produce a high quality project	7,8435	0,01981
At the beginning, I felt that our group could produce a project that could win	18,8682	7.995e-05
At the beginning, I believed that as a group we could spend sufficient time and effort on this project	11,5456	0,003111
I work hard in group projects.	9,5237	0,00855
I am successful in group projects.	12,7486	0,001705
Total score cooperation	14,6965	0,000644
Learning outcomes and performance		
I spent more time in this project than similar assignments in similar courses	14,2858	0,00079
The level of my motivation was high in this assignment.	4,1367	0,1264
This project has contributed significantly to my overall learning in this course.	8,4709	0,01447

The p-values turn out to be significant (smaller than 0.05) for items 3, 10, 16, 17, 18, 19 (related to competition) and for items 13, 14, 15, 20, 21, 22, 24 (related to cooperation). What is more, if we apply the Kruskal-Wallis test to the total score of the competition and cooperation items, both p-values are small (see Table 3). Besides, the p-values of items 22 and 24 are also very significant. Hence we reject the null hypothesis of the medians being equal across the groups for all those items. We conclude that the three groups are non-identical populations at 0.05 significance-level. This means that there are significant differences in the perceptions of students from Finland, Spain and Turkey towards competition and cooperation. These differences may have triggered the differences in students' learning outcomes and performance in the three countries. In the light of these results, *we accept both hypothesis 3a and 3b.*

Conclusions

Our results support literature which suggests positive impact of cooperation on learning outcomes. This is especially the case in small groups where all group members actively participate, and no member dominates the group (see Slavin 1983, Dembo & McAuliffe 1987, Lou

et al. 2001). In our project, groups were deliberately limited to three persons to avoid possibilities of freeriding, and students were asked to freely choose their group members. We believe that free choice of group members avoids possible domination by a single member since students know each other already. From our results, it seems that cooperation also stimulates individual motivation and results in spending more time for learning. This finding, however, is subject to cultural differences, as we see significant differences in results from Finland in comparison to Spain and Turkey (see Figure 2). Cultural differences may be one reason why there is also contradicting findings on the impact of cooperation on learning outcomes (see Krause and Starke 2010).

Earlier literature suggested negative impacts of competition on learning outcomes through restricting choices and destroying creativity (see Amabile 1989, Wang and Yang 2003). Students who thought that they did not have a chance to win could be easily vulnerable to lose motivation and give up (Vallerand et al. 1986). Students could also focus on end results rather than the tasks and choose easy tasks instead of challenging ones with the aim of winning, and that would result in inferior learning (Ames & Ames 1984, Lam et al. 2004). Surprisingly, students in our study did not feel negative pressure due to the competition (see Figure 5). Indeed, a majority of them said that group competition increased their level of motivation (see Figure 4). Perhaps, we should note that again there are cultural differences in that results from Finland differ than those from Spain and Turkey. The fact that a larger portion of students from Finland (in comparison to Spain and Turkey) did not feel that the group competition increased their motivation may be due to the fact that competition is avoided in Finnish classrooms (see Sahlberg 2011). One of the reasons why our results differ from earlier literature may be that we did not apply competition at individual level but at group level. Cooperation at group level may have avoided any possible negative effects of competition on individual students. Indeed, as teachers, we paid attention not to create a zero-sum game by offering flexibility in students' choices of topics and providing tutoring throughout the duration of the project. These may also have contributed to eliminate possible negative impacts of competition.

Our finding that cultural differences in perceptions of competition and cooperation have an impact on learning outcomes and performance leads us to question most of earlier research mentioned in this paper as they are based on samples from a certain culture. Contradictions among earlier research may be due to differences in cultural perceptions of studied sample groups. In our study, we had three different cultural backgrounds: Finland, Spain and Turkey. It is not surprising that results from Spain and Turkey are more similar to each other but different from those from Finland. This is because Spain and Turkey share Mediterranean characteristics, whereas Finland reflects characteristics from northern Europe.

Our findings encourage teachers to develop similar real-life international group competition projects. This may especially be a creative solution in "dull" courses such as business statistics. The project may stimulate student engagement and result in improved learning outcomes. The common project was also a learning experience for us, the teachers, as we learned much from each other through sharing of resources, syllabuses, and ideas. Indeed, it is our intention to develop this common project into a European-level platform for sharing resources, project ideas and outcomes. We believe that more interaction and sharing across the borders may bring more creative ideas, build synergies, and make the experience of learning a meaningful and enjoyable journey for both students and teachers. One possible future idea would be to create multicultural teams where each group has members from different countries. Students would then be utilizing more virtual communication possibilities and be exposed to working in real multicultural learning environments. Another possible future idea would be to develop a virtual business statistics platform to put together ideas, resources, possible research projects, and research outcomes. Such a platform would be the home base to integrate efforts from different countries.

Our research is subject to limitations in generalizability in that it was conducted for the first time with a limited number of students. We

aim to repeat the same research with students of business statistics next year, hopefully including students from other countries as well. In order to overcome this limitation, one possible solution could be to interview selected students from different countries. In-depth interviews could provide richer insights. One further complementary solution could be to conduct surveys with students at different stages of the project. This would provide a dynamic perspective and help better understand how to handle different stages of the process.

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Developing team skills in a MILE classroom

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Abstract

The aim of this paper is to study the Malaysian students' learning experiences in a Multimedia Integrated Learning Environment or MILE. This learning environment integrates the use of multimedia and web 2.0 applications into media-rich and interactive learning environment. Students were required to use the MILE to learn in a media-rich environment and to cooperate in a group to complete their required project which was to develop a multimedia-based website. A set of tests as well as open-ended and close-ended surveys were administered to the students to gauge their learning experience in this blended environment. The survey results indicated that the students enjoyed developing their project and managed to learn the required content while doing so. They were also able to use the MILE to enhance their cooperation with one another in teams while enhancing their team-based skills to complete their assignment.

Keywords

Cooperative-learning, Multimedia, Student-centred

Introduction

Today, many classrooms are employing the student-centred approach to learning. This approach focusses on activities that allow students to actively participate and explore areas based on their ideas and experience (Motschnig-Pitrik & Holzinger, 2002). Numerous studies have suggested that by involving students to actively work in groups and in project-based activities enhance their learning process (Neo, 2003; Herrington, Oliver, Reeves & Woo, 2007; Saddler 2008; Huang, Huang & Yu, 2011). One such project-based learning approach is cooperative learning. This learning approach was propounded Vygotsky (1978) who suggested that learning is a "social activity". He stated that through socialisation students are able to learn from their peers as well as their teachers to form an active learning environment.

Literature review

The concept behind cooperative learning is to encourage students to learn through group activities. The idea behind a cooperative learning environment is to create a conducive learning environment whereby students are encouraged to work in small teams and assist each other to problem-solve and to achieve their learning goals, regardless of their levels of abilities (Piccinini & Scollo, 2006; Huang, Huang & Yu, 2011). The experienced gained from working in a cooperative learning environment has resulted in the improvement of performance and better retention than working individually (Stevens and Slavin, 1995). Therefore, cooperative learning

strategies results in better learning attitudes as the students are given the opportunity to process knowledge and tasks together, develop more in-depth understanding of the subject matter, improved social skills and increase motivation towards learning.

The cooperative learning framework is based on Johnson and Johnson (1994) model which identifies the essential five components in a cooperative learning environment. They include positive interdependence, individual accountability, promotive interaction, interpersonal skills as well as group processing. In order to identify strong cooperative learning structure from lesser ones, all of the five elements need to be present (Smith, 1995). As such, it is vital for the practitioners of cooperative learning to ensure they are embedded into the learning environment.

Web 2.0 tools

With the expanding lexicon of Web 2.0 applications, the landscape of education has evolved from using technology to teach to using technology to construct knowledge. The current student body too has evolved to a more techno-savvy and techno-hungry users as social networking tools have become part of their social lives (Windham, 2005). As such, the need to include these techno-social tools into the classroom has become the focus of many research studies in the educational field.

Goh, Quek, & Lee (2010) states that Web 2.0 is able to create an active learning structure that promotes communications among the users. One such Web 2.0 tool is web-logs or blogs. Through the use of blogs, learners are able to share and express their opinions with the other members in the classroom or groups. By creating this learning space, individuals feel a sense of empowerment as they are given the opportunity to voice their opinions through entries and comments, thus, allowing learners to feel part of a larger learning community (Farmer, Yue and Brooks, 2008). Therefore, blogs can be considered as learning tools as it encourages learners to express and interpret their ideas, reflect on their work (Fiedler, 2003) and perform critical thinking exercises, creating an ideal space for constructivist learning to transpire. However, in order to fully utilise blogs as learning tools, appropriate pedagogies are needed (Makri and Kynigos, 2007). By integrating the cooperative learning pedagogy together with the activities apparent through blogging, students are able to be engaged in tasks that can go beyond the classrooms, promoting deep and meaningful learning.

MILE space

The purpose of the project is to integrate the use of Web 2.0 tools with effective pedagogy, namely cooperative learning, to create a learning environment that takes advantage of the social skills learnt by these students and use them to enhance their learning experience. Therefore, the Multimedia Integrated Learning Environment (MILE) was created to facilitate the cooperative learning process among learners in a private university in Malaysia utilising the available and accessible technology. While it is possible to use public access service providers like Blogger, Tumbler, Wordpress and others, the purpose of this Telekom Malaysia (TM) R&D Berhad funded project is to develop an in-house learning system for the students in Multimedia University (MMU) under the Digital Home initiative.

The concept behind MILE is to allow student-centred learning to take place beyond the walls of the classroom and in their homes. It consists of two areas: multimedia learning objects and a web-log application, codename Orion. The objective of MILE is to facilitate a change in the educational landscape in Malaysia by providing a learning environment using both individual and social constructivist approaches. While the multimedia learning objects allow the students to learn the content of the classroom, the web-log application allows the students while working in groups to communicate, reflect, and share their thoughts and work-in progress with their group members as while as the entire class including their teachers and tutors. Thus, allowing a learning community to be created and maintained within the classroom, physically and virtually. However due to the large scope of the project, the objective for this paper only focusses on using blogs (Orion) as a learning tool by studying the learners' attitudes in using this environment.

Method

A study was carried out on second year students in a course in Multimedia University. The purpose of the course was to give the students hands-on experience to create digital content. Their class project was to create a website in small group based on a class theme. Students were given lectures on multimedia content creation as well as multimedia creation skills in tutorials. The course duration took about 14 weeks and the students were required to work in groups cooperatively and had to depend on each other to accomplished a common goal which their assignment. Each group had to use their multimedia knowledge and technical skills learned from this course to create an appealing design, and content to highlight the various aspects of Malaysian tourist destinations. The main purpose of the assignment was to provide them the opportunity to inculcate these skills into lifelong learning skills.

Research Design

The students were given quantitative and qualitative research instruments to ascertain their attitudes and their learning experience in this environment. The mixed method utilises the triangulation approach to data collection. Triangulation refers to the combination of several research methods, both qualitative and quantitative methods to analyse results (Creswell and Plano Clark, 2010; Denzin 2006).

While the Likert scale survey can provide insight to the students' attitude in the learning environment, the qualitative instruments (open-ended questions including their feedback from their final report) are meant to support and supplement the quantitative results (Laxman, 2011).

Sample

There were 53 students actively participated in the study (n= 53). The students were all age range between 19-25 years old and all of them do not have any multimedia knowledge and technical skills

Activities in MILE

Though the students were used to working in groups in other courses, they were not used to documenting their progress of the project using blogs. Students now had the opportunity to share their ideas as well as their progressions with their fellow group members while cooperate with one another in order to complete the assignment. By using both the Orion blog system and the multimedia learning objects, the MILE provide the learner a new learning experience in learning about content development as oppose to the typical conventional classroom structure. The activities that the students were involved in the MILE are listed in the Table 1 below..

Table 1: Activities performed in the MILE

Activities	Description
Individual registration	In order for them to begin the process of documentation, each student had to register with the MILE blog system, codename Orion. However, students had to register using their MMU email only. This was to prevent unauthorised persons from using the blog as it was a close system only allowing students registered for the course access. Once the registration process was complete, the students now had to opportunity to create their own blog space within the Orion application.
Teaming up	Each student was responsible to choosing their own group members and each group consisted of between 4-5 individuals. They were responsible to deciding on their team mates as their selection may affect their outcome of the project. Many chose either persons that they worked with before or persons who they thought was responsible.
Ideation	Each team had to come up with their interpretation or idea for the project. A proposal was created and posted in the blog detailing their members, their ideas or selection of the theme, the objective as well as the target audience.
Design and Development	Students are to do some research on their topic of choice and to design the layout and structure of their website. Their design of the graphical user interface as well as the structure of the overall website is to be shown through sketches, flowcharts and design boards. Once that is complete, they are to develop them using Adobe Photoshop, Dreamweaver and Flash. Their content, designs, flowcharts, sketches, use of tools, references and other information pertaining to the development of the project were to be documented and shared with their team mates as well as the class through the use of blogs.
Content and skills	Throughout the semester, students were given content in the form of lectures as well as tutorials. The lectures were to provide some prior knowledge in multimedia development and the skills were to provide them with the development skills necessary to complete the project. However, several lectures were substituted by the multimedia learning objects created as part of the MILE. These multimedia learning objects were designed using Adobe Flash to provide an interactive media-rich learning environment for the students to learn at their own pace and their own convenience of their home or learning space.
Group structure	Each member of the team will be responsible for an area of the website. They will work interdependently as their website is to be assessed both as group as well as individuals. Each member needs to cooperate and communicate with the group as a whole through discussions to determine the design, structure, direction, layout and final output of the website. They also will help each other to solve problems and support each others efforts to complete the task. They shall keep each other appraised with their progress using blogs and help one another to achieve a common goal. The blogs also helped them to communicate problems, solutions and praises among the team members.
Guidance	The role of the teacher is as their consultant to direct them to complete the project as well as the answer any queries they have about the project and the requirements. Also, any technical difficulties or unresolved issues were brought to the lecturer to moderate and resolve them.

Research Instruments

Data was collected from various research instruments including a Likert-scale survey, open-ended questionnaire as well as their write-up of their experiences in their final reports. By gathering the data from these instruments, the data was later triangulated to provide a clearer understanding of the students' attitudes and perceptions as well as their overall experience using blogs for learning in a multimedia cooperative learning environment. It has to be noted that this was the first time the students in the course were structured as such and since this course was the first multimedia course in their degree, it can also be assumed that it was their first time they had to work cooperatively to develop a multimedia project.

The survey administered to the students was a set of 5-point Likert-scale survey items (1=Strongly Disagree to 5=Strongly Agree). There were about 16 questions in the survey that allowed the students to provide feedback on their attitude towards working in this environment. The objectives of the survey consisted of the following areas:

- Blogging Environment
- Group Communications
- Understanding and Learning
- Receiving Comments
- Quality Work

Once the students have submitted their final and complete assignments, the survey containing the Likert scale items were given to them. Also, included in the survey is a set of open-ended questions that were also given to the students to answer. The question related to their experience working as a team and how they felt doing so. The students were keen to provide feedback on their experience working in such a learning environment.

Results

Table 2 described the findings of using multimedia in a cooperative learning environment. There were 53 students who actively participated in this study. All the 16 items in the survey were listed with their Means (M), Standard Deviation (Std Dev), and the total positive responses in percentages (p%) of each item. The items in each category were listed in descending order according to the means.

Table 2: Results of the survey

No.	Survey	Mean (M)	Std Dev	P (%)
	Blogging environment			
1	I was able to upload my media files (images, video etc) to the blog.	4.00	0.784	81.1
2	Reading my own entries made me reflect on my work done.	3.85	0.864	75.5
3	I was able to write my project progress in the blog.	3.77	0.891	66.1
	Group communications			
4	By using blogs I was able to communicate my progress to my group mates.	3.83	0.975	73.5
5	Blogs allow me to comment on my group mates' work.	3.87	0.761	73.6
6	The blogs helped my group cooperate together more efficiently.	3.72	0.863	62.3
	Understanding and Learning			
7	Reading other blogs allowed me to increase my understanding of the course.	4.06	0.663	84.9
8	I was able to learn more by reading other blogs.	4.00	0.734	81.1
9	I was able to use the blog to document my learning progress	3.94	0.718	79.3
10	I was able to enhance my learning by writing entries in the blog.	3.70	0.822	71.7
	Receiving comments			
11	The comments I received made me learn more about my work.	4.00	0.809	81.1
12	The comments made me enhance my work.	3.98	0.772	77.3
13	I like receiving comment on my blogs.	3.87	0.810	75.5
	Quality work			
14	Looking at other blogs allowed me to generate better ideas for my work.	4.25	0.617	90.6
15	I was able to compare the quality of my work with others by reading their blogs	4.08	0.646	83.0
16	Reading other blogs allowed me to do my best work.	4.06	0.745	79.2
Overall Cronbach's Alpha=0.893				

From the results shown above, the overall Cronbach's Alpha for the survey was 0.893. According to Lim, Khine, Hew, Wong, Shanti, and Lim (2003), the reliability value of the survey reach 0.6 and above are considered dependable. Thus, the survey in this study is deemed reliable. The following section focuses on the discussion of the results in details. In addition to the Likert scale survey data, several open-ended questions were given to the students to provide feedback

on their experience working in teams as well as using blogs in their learning. These open-ended questions generally ask them what they liked or disliked about the experience and why. The student feedback will be presented as part of the discussion below to provide more evidence of their experience in this learning environment.

Discussion

The overall results of the survey were very positive as the means for all the items were above 3.5, ranging from 3.70 to 4.25. This high means indicate that the students in the MILE enjoyed using the blogs in their learning process.

Blogging environment

From the items in this area, it is obvious that the students did not have problems with blogging. They were able to upload content for their entries including multimedia elements like video, images and so on to support their ideation while able to write their entries. They were also comfortable to read their own entries to reflect their learning in this environment. The means ranged from 3.77 to 4.00 with fairly high positive responses of above 60%. This is further supported by the comments taken from the open-ended questions such as *"Being able to create my own space that I feel confident with to work in", "I found using blogs helpful to learn and easy to use" and "I can share my work with others".*

Group communications

Since the project is also based on cooperative learning and team work, the results show that the students were able to use the blogs to communicate with their group members. By using the blogs, they were able to communicate their progress to the rest of their team members (Item 4, m=3.83). Also, the students found that they were able to express their comments on their team mates' progress as well (Item 5, m=3.87). Thus the majority of the students in this study agree that using blogs helped them cooperate and communicate effectively (Item 6, m=3.72), although there were a small minority group that were undecided on this item as well. The following comments such as *"I like it because it is more efficient when group members cannot meet physically for a meeting", "It is easy way to communicate with my members, share information and ideas" and "I was able to discuss with my group mates and able to do all the necessary editing on the spot" helped strengthen this students' attitudes.*

Understanding and Learning

From the items in the survey above, the results show that the students were able to learn and understand the project using blogs. They were able to read entries of others and write their own entries in the blogs which help them reflect and enhance their understanding of the project. Reading other blogs help them gauge their understanding (Item 7, m=4.06; Item 8, m=4.00) while documenting their process and progress allowed them to reflect their understanding of the course (Item 9, m=3.94; Item 10, m=3.70). This insight is clearly supported by their comments taken from open-ended questions stating *"I am able to show off my working to others and it can made me reflect", "I am able to learn in the blog environment such as can improve my writing skill" and "I can compare and update my work with other classmate without meeting up with them".* Therefore in this MILE using blogs proved to be a suitable tool for learning.

Receiving comments

The results in this area indicate that commenting was an important part of the blogging process. The students found comments on their work were helpful for them to enhance their work. The means were very high, ranging from 3.87 to 4.00 with also very high response rate (75-80%). This clearly shows that the learners like receiving comments and found them helpful to judge and improve their work. Moreover, the comments stated by the students *"Getting comments are helpful especially from lecturer", "I can improve my work by looking at comments from others" and "Get comments are encouraging"* provided more support that the students look forward to receiving comments from their peers and teacher.

Quality work

These are the highest items in the entire survey with means all above 4.00 (m=4.06 to 4.25). This indicates that the students found that using blogs were helpful in doing their best quality work. They indicated that by viewing other students' blogs entries allow them to gauge their quality of work with others in the group as well as their peers. They also stated by comparing their own work with others, the students were able to upgrade their quality of their own work. This was probably the best reason for the students for using blogs. Moreover, the statements taken from the open-ended questions provide more evidence that blogs motivate the students to do quality work. The statements include *"It helped me enhanced my own skills", "Looking at other blogs allowed me to generate a better idea" and "I learnt how to observe other classmates' blog so that I have a benchmark on whether I did my work well enough or not".*

Overall, the study shows that blogs were a good tool to support and enhance the student learning experience. The students enjoyed working using blogs and were able to understand and learn from each other. They were able to cooperate in teams and communicate their process and progress in this assignment. They enjoy receiving comments from their peers and group mates stating which they found helpful in judging and improving their work. Finally, the students also showed that blogs motivated them to do their best work as they were able to view and compare the quality of their work with others in the course.

Conclusion

The study indicates that using blogs in the MILE was a good tool to enhance student learning. The blogs allowed students to keep in contact with their teams even outside of the classrooms while reflecting on their progress and learning process. The project was successful in showing that student-centred learning using web 2.0 tools improved the interaction between peers in the classroom. Therefore, the MILE can be used as a viable student-centred approach to learning.

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Study case: Wellbeing pilot – Co-operation between students from higher education and vocational school

Auli Hietanen & Nina Lahtinen

Introduction

The education innovation and integration project ”Koulii” is a common pedagogical development project at Laurea University of applied sciences and Omnia vocational college. Target of the project is to provide customer-driven services for the growing area Suurpelto in Espoo Finland, as well as develop co-operation between the higher and the vocational education. The result of the Koulii project will be a model of functional co-operation which will enable joint studies and development projects between these two levels of education.

“Vihreä keidas” pilot

Koulii project involves seven development pilots, which consist of teachers and students. “Vihreä keidas”(Green Oasis) is one of these pilots. Vihreä keidas consist of two teachers from Degree Program Beauty and Cosmetics from Laurea University of applied sciences and two teachers from Beauty Therapist Training from Omnia Vocational College. Teachers are working as a team and together with students. The goal of the “Vihreä keidas” pilot is to create an innovative model of co-operation and create a new way to provide beauty and wellness services. Suurpelto area is a living lab environment for the project. Services are developed by using a theory and method of a service design. Design for services can develop platforms that enable people to connect and collaboration in new ways imagining and experimenting with new service models (Meroni and Sangiorgi 2011, 207).

The theoretical background consists also of a culture-historical activity theory. According to the theory, an activity consists of different kinds of activity systems. Expansive learning arises inside those systems (Engeström 1987, 2001). Activity system is an established convention according to which one acts in a community, which shares tools, rules and division of labor in their acting. There is also an object for the activity. (Virkkunen ym. 2001, 19-21.) In this project we try to have two different kind of activity system from Laurea and Omnia working together.

Service Design process

The project started with a kick-off event in Laurea. The whole student group consisted of fifty-eight students coming from both schools. They were divided into ten teams by teachers. Each team got a different project to plan and implement. Seven of the teams were given the task to produce the contents for a web site, whose target group consists of teenagers from elementary schools. The topics of the web site were teenagers’ skin, hair and hand treatment, make up, treatment of acne skin as well as beauty care professions and beauty care in general.

The three other teams were given the task to design and organize three wellbeing events for inhabitants of Suurpelto area in Espoo. In this paper we examine these three teams and their service design processes. Service designers use pilot projects and service prototypes as a way to allow people to co-create new collaborative solutions of services (Meroni and Sangiorgi 2011, 207).

The first step of the service design process is exploring. Service designer will be trying to discover new perspectives on a service. This could involve stepping into the shoes of customer order to develop new insights into the service experience (" (Stickdorn and Schneider 2010, 149).

Vihreä keidas pilot has earlier done service design studies with teachers, students and inhabitants by using techniques such as storytelling examine. Storytelling is a method for sharing insights and new concepts. It situates new or improved services within a narrative context, using key insights and ideas to tell stories from a variety of perspectives (Stickdorn and Schneider 2010, 202). The other technique used was an expectation map. Making an expectation map involves investigating and charting what customers expect for a service. It also serves a diagnosis tool, drawing out those areas of a service which need attention from a customer-based perspective (Stickdorn and Schneider 2010, 176)

The second step of the service design process is creating and reflecting. Creation is where insights are visualised into new ideas and concepts, while reflection involves testing these ideas and concepts to find out how they can be further improved (Stickdorn and Schneider 2010, 149). The teams took advantage of the conclusions of earlier service design studies and created three innovative events for inhabitants of Suurpelto area. Customer orientation in service management plays an important role in every phase. Customer orientation is indispensable during service development and ongoing source of information (Edvardsson, Gustafsson etc. 2006, 263).

The topics of the three wellbeing events- teams were skin care, applying cosmetics and wellbeing. All three teams were successful on their task. There were several stands which allowed the customers service experiences in the events. These stands gave customers advices for example skin treatment, healthy nutrition and relaxation. In addition, there were available pampering treatments such as Indian head massage. A service is a provider / client interaction that creates value and they co-produce the service event, because one can't do without the other (Katzan 2008, 2). In the events there were also offered tea, soft drinks and some snacks. The teams have acquired sponsors from wellbeing and cosmetics companies. Each team made also a feedback survey for customers after the event.

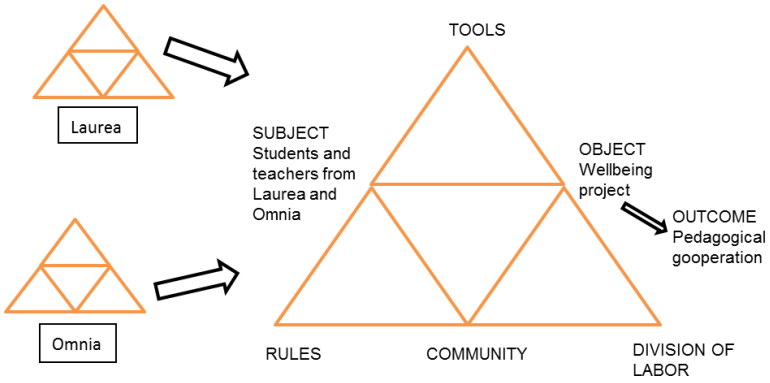
The third step of the service design process is implementing. The tools in the implementation stage provide ways to bring the new or improved service to use. Implementation means putting ideas into action (Stickdorn and Schneider 2010, 149). These wellbeing events concepts can be transfer to the other audience in different places. Customer involvement means "coming close to customers" in order to learn from and with them in new and fruitful ways using methods beyond traditional research methodology (Edvardsson, Gustafsson etc. 2006, 2).

Activity theory in wellbeing project

Significant point in this project was cooperation between students and teachers from Laurea and Omnia. Both schools have their own activity system, and there is a lot to organize when teachers and students from two different activity systems are creating one shared system. (Figure 1.)

When people from two different activity system work together they need usually agree rules and division of labor. Also tools and many other things can be different, but important is that both of active subjects understand object and outcome same way.

Figure 1: From two independent activity system to one shared activity system



Subject

Traditionally at school teacher is the subject and student are objects. These days at Laurea and also other universities of applied sciences situation is different. Students are very much subjects of their own learning and also subjects in development work. (Lahtinen 2008, 110.) In this wellness project students and teachers from Laurea and Omnia worked together. Teachers from Laurea also guided students from Omnia, because they worked in one activity system. Also all the teachers and the students evaluated projects.

Object and go-operation

Part of this project was that students organized three beauty and wellbeing happening in Suurpelto. And other part was that the teams produce the contents for a web site, whose target group consists of teenagers from elementary schools. When object was providing wellbeing happenings and outcome was pedagogical cooperation, students from two schools really worked together as one team. They understood the object same way and worked together to achieve a target. Comparing teams who worked in other project and wrote information about wellbeing to internet pages cooperation was very different. Teams, who were only writing texts, worked side by side but not really together. They understood the goal, but everyone worked in her own way or the way she had used at her school. Only some students from same school worked together, but afterwards team leader put detached texts from each school or from each student together as a one text.

The object connects activity system (Kerosuo 2006, 88). The more concrete object is, the better cooperation works. It is important, that when we try to get people from detached activity systems work as a one system, the object is as concrete as possible.

Tools and rules

In one team there were about six students - three from Laurea and three from Omnia. Students worked together and everyone used different kind of skills in different tasks. Students had different kind of tools in their own toolbox. Students from Omnia had practical skills for example skincare. Students from Laurea instead were used to do projects and project reports. Their writing tasks were good.

Also teachers were used to use different tools and rules for example in evaluation. All rules as much as possible need to agree forehand, that students knew what they are expected to do to get the project pass. It is important that people who actually do the activity also agree rules and choose available tools. Agreements by the managements are not always adapted practical use (Kerosuo 2006).

Division of labor

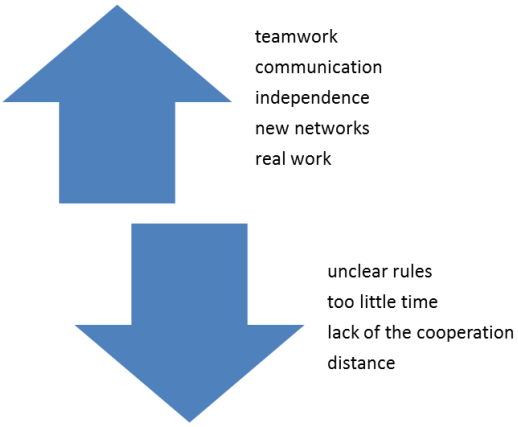
In this wellness project students work developing beauty and wellbeing services in Suurpelto area. They organized three beauty and wellbeing happening. Teachers gave place and subject of happening. Teachers also did marketing together with students. Students

organized the happenings and teachers gave guidance. One team organized one happening and all together there were three happenings. Students worked together and they shared tasks by themselves. Everyone try to use her best skills and choose tasks she can do. Of course lots of tasks were done together and students helped each other as well as asked help from teachers.

Feedback from students

Students from wellness and web site projects gave oral and written feedback. Oral feedback was nearly completely positive and students from both groups found this kind of convention of working very fresh and exuberant. Written feedback was also mainly good.

Figure 2: Positive and negative things of students' written feedback



There were more positive things in written feedback than negative. Also positive things were very significant and large. Negative things were mainly more concrete and most on them are quite easy to rectify when cooperation between two schools go on further.

Students though that positive things were teamwork *"Team worked good and that made project so nice"* and creating new network in beauty field *"it was nice to make the acquaintance of new people"*. Also students appreciated Independence *"independent working was nice"* and working in real life not just practicing at school *"something different and real" "nice to do something in real life"*. Also they find that it was good to communicate between two schools *"it was good to learn communicate with strangers"*.

Negative things were unclear rules *"instructions and timetables could have been more clear"* and quite long distance between schools *"distance was only thing I felt unpleasant"*. Especially students from vocational college are not used to work in their own time and some students hoped more organized time to do the project *"project would need more organized days to work together"*.

Go-operation was partly positive matter, but some teams with website project feel go-operation difficult *"go-operation with students from other school worked poorly"*.

Conclusions

As conclusion this part of Koulii project succeeded better than teachers expected. Pedagogical cooperation between Laurea and Omnia succeeded fairly well. Students work hard and results of their work were excellent. Students feedback was mainly good and negative comments gave teachers information how to improve activity. Also partners in cooperation were pleased. Especially customers in wellbeing activities were delighted and gave good feedback.

Results from the teachers' feedback discussions were problem solving ideas, how to get two activity systems cooperate as good as possible. One example of good cooperation was students who arranged wellbeing activities. They really had to work together even they did not know each other forehand. Compared to other project, were students needed to write content to

website, students in wellbeing cooperated very well together. In website team students from Laurea and Omnia worked parallel but not tightly integrated. Teachers understood that object and outcome of the activity need to demand very concrete working not only writing reports. Cooperation is easier, when object and work are very concrete. Other important thing is rules. Teachers need to understand the rules same way. Then the common guidance is possible. Concrete working and clear rules gives possibility to use different tools and students find easily their own role and task in new community.

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Analyzing group creativity and learning in online environments

Petro Poutanen & Olli Parviainen

Abstract

This paper presents working hypotheses with relevant theoretical discussions for examining group creativity and learning in online environments. Online resources provide indispensable means for various kinds of collaborative activities, and they will have significant influence on higher education in the future. Therefore, it is very important to examine the possibilities that will foster learning and creativity in online environments. In this paper, we examine the mechanisms of group creativity and learning. We present two propositions: First, we propose that the concept of "co-creation"—learning and creating together—captures most genuinely what is happening when, for example, students are collaborating together in order to meet certain learning goals. Secondly, we propose that a co-creative mood is achieved best by letting the learners collaborate in a self-organizing manner. Our suggestion for developing an empirical understanding of co-creation includes operationalization of co-creation and self-organization through the concepts of communication and network analysis. Five working hypotheses are provided for empirical examination.

Keywords

Group creativity, self-organization, network analysis

Introduction

Everyday life is saturated with ICT technology. Technological gadgets and software are easy to use and intuitively appealing. They are abundant and practical. Free online platforms can also be cost-effective and of high quality. Given the high speed of technological development, it is likely that higher education will undergo transformative innovations in the near future (Garrison & Kanuka, 2004). Therefore, research on learning, group work, and creative activities online is of the utmost importance.

In this paper, we focus on discussing creative group work and learning in online environments. It is worth pointing out what we mean by the online environment. Actually, it is easier to say what we do not mean: we are not talking about virtual learning platforms, such as Moodle or Blackboard. However, we do not eliminate them from our discussion. An online environment is here understood simply as *any virtual platform or combination of different platforms providing a means for some kind of communication that enhances the learning and collaboration of the people engaged in achieving a particular goal*. This means, that learners may use one learning platform or they may use a mixture of different platforms from social media to file sharing. With this broad definition, we want to emphasize that learning is not, and should not, be considered as being confined to particular times and places. On the contrary, open boundaries and the flexibility of online environments may foster self-organization and creativity for the learners (Poutanen, Parviainen, & Åberg, 2011).

In 2010, we experimented with a new kind of university course concept at the University of Helsinki. In this course we applied self-organizing principles or "rules," such as "students decide the contents of the course and gather data by themselves," "facilitation is used to enrich collaboration," and "knowledge production takes place mainly online" (see Poutanen et al., 2011). We also made extensive use of online learning and aligned the course so that "outsiders" were free to participate through the virtual platform and access the material we produced in the course. In the end, the lesson we learned was that the more we tried to control and guide the learning process, the less inspiring it became. Instead, we focused on encouraging and stimulating students. The feedback was extremely good, and a new kind of course concept emerged.

In this paper, we set about continuing this work by outlining hypotheses for empirical examination of online creative group work and learning. Since we believe that communication between participants plays a key role in successful learning, the role of network analysis as a research method is discussed. The research question guiding our empirical work is: *How can we measure the self-organization of online learners and assess participants' co-creation capabilities*? This information would be of the utmost importance when planning courses tapping into participants' own creativity and basing the courses, at least partly, on online collaboration. In the following discussion, we present the theoretical assumptions in which our research hypotheses are grounded and introduce the method of empirical examination. Finally, we present our hypotheses.

Relevant literature

Creativity and learning in groups

In this paper, we study creativity and learning as a collaborative effort. Learning can be defined as a change in an individual's or a group's cognition, knowledge, or skills (Salazar, 2002). We have earlier proposed (Poutanen et al., 2011) that when learning multifaceted and open-ended issues, learning and creativity are inextricably entwined. When the change happens, it is likely to take place due to the experience of value or novelty. This moment is contextually bound to the goals of learning, individuals' prior skills, knowledge, and experiences, and in the case of groups, the social interactions of the learners. According to Poutanen et al., (2011) this act can be seen as parallel to psychological creativity (Boden, 2004, p. 2) in which individuals (or a group) learn or invent something that is new and valuable for them. Beghetto and Kauffman (2007) call this creativity inherent in the learning process "mini-c." According to them, central to mini-c is the dynamic and interpretative process of constructing personally meaningful knowledge in some socio-cultural context. Similarly, we suggest that *group learning is a creative process in which people construct something personally and socially meaningful and, in a sense, "co-create" the content of learning in interaction*. To put it another way, co-creation is learning and creating together in the same breath.

Self-organization and group communication

To better understand the dynamics of co-creation, we propose two additional concepts: self- organization and dissipative and integrative communication. As suggested in this paper, together these concepts provide a description of the key processes that are operative in co-creation.

The concept of self-organization comes from the field of Complexity theory (see the other paper by Poutanen in this proceeding). A system that can change its own organization independent of any external control is said to be self-organizing (Prigogine & Stengers, 1984). It means that the system is neither designed nor controlled by anyone. Mitchell (2009, p. 13) defines self-organization as a system's ability to create its own organization, independent of top-down control, by following a set of simple rules that enables collaboration. Examples of self-organization include the operation of markets, human biology, and the movement of flocks of birds.

In the context of creative group work, self-organization refers to the system's capacity to create its own values, criteria, and ways of working (Montuori, 2011). A tightly controlled group can do well with routine tasks, but self-organization allows the members of the group to develop their own ways of doing things (p. 418). Yet, self-organization does not take place in a

chaotic way; instead, it is governed by goals and rules setting certain limits for the levels of creativity, much like the improvisation of jazz musicians (p. 418).

This idea is well discussed and developed by Sawyer (1999, 2003, 2010) who has studied group creativity in the context of improvisation. According to Sawyer, creativity is collaboratively emergent phenomena of the group, meaning that no single member of the group accounts for the outcome. Sawyer (e.g., 2003) describes the mechanism of group creativity or "collaborative emergence," as he refers to it, as follows (p. 12). In an improvisational setting, one should have no pre-structured plans or leaders governing the group's interaction. Instead, certain improvisational instructions, such as avoiding "playwriting" (having expectations of what others will say) should be followed (Sawyer, 2003, p. 9). Every individual contributes to the common pool of ideas, but the development of ideation is always subject to the group's acceptance of suggested contributions (1999, p. 452). For example, a member of the group may try to change the direction of the improvised conversation by suggesting some novel idea for the plot to continue. However, the idea is interpreted and evaluated relative to the others' interpretations concerning the goals of the improvisation and common storyline before it can be accepted. In this sense, creativity is continuously emerging from the collaborative interaction of the group's bottom-up (individual contributions) and top-down (collaborative evaluation) processes (p. 455–456).

Mitchell's (2006) discussion of complex biological systems' ability to "explore" and "exploit" in an optimally balanced manner is parallel to Sawyer's collaborative emergence. According to Mitchell, complex systems in biology are able to fluidly adapt their exploration and exploitation processes according to gathered information; resources given to any strategy depend on the perceived success at any given time. Mitchell discusses, for example, on the immune system in which the most successful "lymphocytes" (type of white blood cell) searching for pathogens are given more weight in the subsequent offspring, while less promising ones are never completely neglected. Another example that Mitchell offers is ants foraging using parallel strategy. Initially ants explore food sources in random directions, and once food is found, pheromones act as a feedback mechanism that draws others to the spot. However, due to many random elements, some ants keep on walking their individual paths while occasionally bumping into serendipitous food sources—a phenomenon discussed also within creativity research (e.g., Boden, 2004; Mednick, 1962). Mitchell also points out the important notion that the optimal balance shifts over time; early explorations are based on little information, and they are largely random and unfocused, bottom-up searches. As information is obtained and acted on, the search becomes more focused and top-down in alignment with the system's feedback mechanisms (see also Hofstadter & Mitchell, 1994; Holland, 1992).

Mitchell's description of exploration and exploitation provides a way to understand the two different types of strategies—or processes—that are simultaneously at work in the creative process: the exploration of new ideas and information and the exploitation of the obtained information for generating better ideas and solutions to meet certain goals. While some information may turn out to be useless, other information may prove to be indispensable—a fact that will be learned only over time. Therefore, we need both free divergent ideation and more critical evaluation. However, as bottom-up individual explorations are more common in the initial phase, over time they tend to be replaced by the top-down group-level consensus on how to proceed toward the desired goals. This shift in the relative strengths of the two processes is likely to happen due to learning. As the system learns more on the task at hand, its search becomes more oriented and focused.

How then, can these different types of interactional processes be studied? Aula (1996, 1999) has suggested that communication has the "dual function," or potential, both to maintain the existing meaning-making structures and to disintegrate them. Both functions are present at the same time, and one can, for example, by creating diversity of the existing meaning-making structures, increase the chance of emergence of new meanings in the unfolding interaction. Similarly, integrative communication can be used to bring coherence into a dismantled situation. According to Aula, characteristics of dissipative communication are metaphoric

language, dialogue, polyphony, spontaneity, etc. Integrative communication, in turn, is accurate, intentional, and controlled (see also Aula & Siira, 2010).

We assume that the model of the dual function of communication can be useful in understanding how exploration and exploitation happens in creative groups. The creative process is often seen as divergence-producing behavior, as proposed by Guilford (1967). However, divergent thinking is not worth much without the ability tell the good ideas from bad ones, and then integrate the best ideas. This is where convergent thinking skills come into play. Therefore, these two processes can be seen as equal to exploration and exploitation behavior. At the level of group communication, we suggest that *divergent and convergent thinking can be promoted and applied by the means of integrative and dissipative communication*. Similarly, we suggest that *the amount of dissipative and integrative communication implies and corresponds to the levels of self-organizing processes relevant to creativity, namely bottom-up exploration and top-down exploitation*. This claim can be empirically examined by the network approach.

Method

Social networks

The term *network* is used in various ways as to refer to decentralized, complex, and multiple actor systems. "Network" can be used as a part of a theory (Castells, 1996) when it is used to model the actors' relationships to each other. "Network" can also be used as an analytic concept that is formed from methods for gathering, handling, and modeling action (Johanson, Mattila, & Uusikylä, 1995). In addition, "network" is used in identity construction and cognitive conceptualization of organizations (Ibarra, Kilduff, & Tsai, 2005).

Network analysis

Social network analysis (SNA) is a set of various methods for describing and studying human interaction, and it is used to study repeating patterns in connections linking social actors (Wasserman & Faust, 1994). This means that the unit of analysis is not individual actors but the entity consisting of these actors and the links connecting them (Wasserman & Faust, 1994). Usually the aim of social network studies is to locate a set of actors forming a distinct subgroup and actors who are filling specific roles or positions (Freeman, 2005). SNA carries a few central concepts. Subjects interacting in a network are called by various terms (nodes, points, actors) as are the relationships connecting them (links, ties, arcs, connections). In this study we use the terms "actor" and "connection" for the sake of clarity. Actors in networks can be people, groups of people, or larger organizations. Connections between actors can describe, for example, family ties, the flow of support or resources, emotional valuing, interactive behavior, or membership to a group (Wasserman & Faust, 1994). Connections can be directed or undirected depending on the relationship. A connection describing, for example, "discusses with" is un-directional, whereas, in "asks advice from someone" the direction of the connection is important. In a directed connection, the sender and the receiver can be distinguished. The strength of the connection can also vary. It can be either dichotomous (connection is present or absent) or valued (Wasserman & Faust, 1994). The value of the connection represents the strength, the intensity, or the frequency (Monge & Contractor, 2003).

Density and centralization

In social network analysis, the attributes of the actors are usually associated with some specialized network statistics. Network statistics describe either the actors' network properties or the properties of the whole network. Individual actors' network statistics describe their position in the network in relation to others. The most relevant of these measures is the degree centrality (Everett & Borgatti, 2005). Degree centrality measures the number of connections an actor has.

Statistics describing the whole network can describe values such as density, reciprocity, or centralization. Density is represented by a figure between 0 and 1; 0 corresponds to the situation in which none of the possible connections are present, and 1 describes the situation in which every possible connection is present. Reciprocity tells what percentage of the directed relationships in a network is mutual.

Centralization tells how much structural power in a network is centralized to the single actor. A central node in a network is an actor whose position allows him/her to access, spread, or control information, attitudes, and communication.

Hypotheses

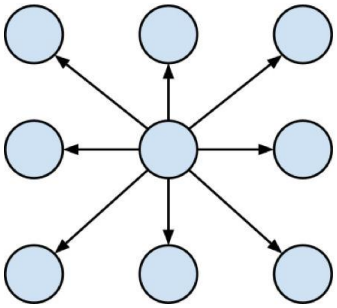
Dissecting the style of communication from the textual material can be time consuming, especially when the amount of material is large. Rather than assessing the style of communication, one would be better off analyzing the structural patterns of communication. Using social network analysis (Wasserman & Faust, 1994) to detect interaction patterns, for example, in a learning platform or in social media, would reveal the style of communication. This analysis can also be conducted via interviews or surveys, but conducting them can be laborious and even intrusive. Observing online communication is a non-obtrusive method for gathering data for analysis. Using time-stamped discussion data, the researcher can assess the volume of interaction and use social network analysis to reveal the structure of communication.

Hypothesis 1: Group communication has a tendency to get more centralized when the amount of integrative communication increases.

An example of integrative communication is a clear statement of instruction concerning single tasks or work processes (Aula, 1996, 1999). As the division of labor increases, tasks become more straightforward, and roles become more formalized. The efficiency of the group to perform clear tasks also increases.

The corresponding network structure would resemble a *hub and spoke* structure (see Figure 1), where a central figure coordinates the actions of the rest of the group. A characteristic for integrative communication is the low amount of communication as most of the communication goes through the "hub" and not between the peripheral members of the group. This kind of structure works best when the outcomes of the working processes are clearly defined. Usually, this happens in the later stages of a group's work.

Figure 1: Hub and spoke structure.



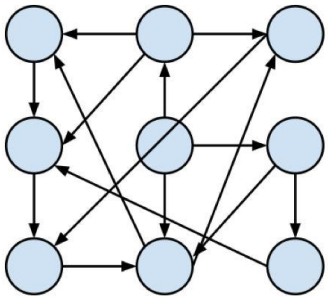
Combining the structure with the volume or frequency of online communication, the researcher can assess the current working state of the group. If the structure resembles a hub and spoke structure and the overall volume of communication is not high, there may be integrative communication taking place, implying that the group is exploiting rather than exploring new possibilities for its creative endeavor.

Hypothesis 2: Group communication has a tendency to get more decentralized when the amount of dissipative communication increases.

Dissipative communication creates confusion as existing assumptions and meanings are challenged (Aula, 1996, 1999). Characteristic to the confusion are conflicting opinions, information, etc. To overcome the confusion, members of the group usually turn to an authoritative figure (cf. H1). If the authoritative figure is the source of this dissipative communication or is unable to provide guidance,

people tend to turn to each other for advice. This increases the amount of interaction between all members of the group. The increasing amount of communication exposes group members to new information. However, managing new information and communication is taxing and requires a good deal of energy. Task-oriented action is difficult in this stage.

Figure 2: Hairball structure.

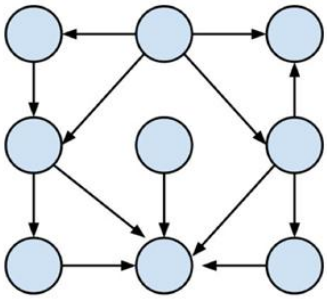


Characteristic of the structure of decentralized communication is the *hairball* structure (See Figure 2), where clear patterns are hard to detect. As the number of communication dyads increases, so does the volume of communication. This stage implies that the group is more likely to explore new possibilities and information and/or generate new ideas rather than exploiting old ones.

Hypothesis 3: When the amounts of integrative and dissipative communications are in balance, group communication has a dialogic nature.

Dialogue is possible when the overall structure of communication moves towards a more defined order. An example of this is a classroom of 30 students who are divided into smaller working groups. The clustered structure (see Figure 3) indicates a level of integration while maintaining the possibility of exchanging ideas among multiple communication partners.

Figure 3: Clustered structure.



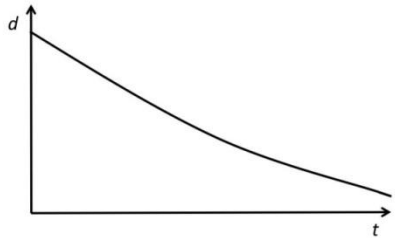
The characteristic communication structure for the dialogic phase is a network that consists of small clusters connected to each other. The volume of communication might slightly decrease compared to the more dissipative phase, but it remains overall quite high. This "balancing" state between exploration and exploitation can be thought of as the most effective working method in the middle part of the process.

Hypothesis 4: In creative group work, communication's dissipation has, on average, a tendency to decrease along the line of the work.

When a group is forming, its roles and communication routines take a while to become established. Routines may also break if the group experiences changes in its configuration or purpose. But, as the group's tasks and roles

required to achieve their goals become clearer, communication tends to adopt more integrative style. Instructions and responsibilities guide actions more than ad hoc communication. This is not to say that the process is deterministic; the process can be reversed on purpose or by accident.

Figure 4: Dissipative communication.



In order to detect the stages of the creative group work, multiple samples of communication structure and volume throughout the work process is needed. We anticipate that the amount of possible communication links (density, d) is decreasing as a function of time (t) and that the structure becomes akin to the hub and spoke structure (see Figure 4).

Hypothesis 5: In creative group work, the dialogic phase (cf. H3) is considered the most optimal in terms of the number of surviving ideas the group generates.

Using Hypothesis 1–4, we can surmise that the group's communication structure and volume is indicative of the group's current communication style. This also works in the opposite direction; if the researcher or teacher has knowledge of the group's current phase, he/she may try to influence it (reversing or accelerating) by encouraging the communication style corresponding to the desired working phase. In the dialogic phase, the group is balancing between dissipation and integration. Maintaining equilibrium can be difficult since the pressure to complete the task drives the group toward a more integrative communication style. However, in order to achieve creative solutions, the group needs to produce new ideas, in which case, dissipative communication is essential. We assume that the balancing state is optimal for generating ideas that are likely to be incorporated into the final solution.

Conclusion

In this paper, we have provided theoretical premises and working hypotheses for empirically examining group creativity and learning online from the perspective of self-organization and communication. Studying possibilities to foster learning activities online is of great importance. Successive online learning includes collaboration and the joy of discovering something personally new. In collaborative settings, the group or community members need to develop a collective understanding of their objectives and co-create the content of learning together. This type of learning may provide an extremely useful approach for higher education since the significance of online tools is likely to increase and more creativity is certainly needed in a world that is increasingly turbulent

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You are crazy!: Developing creativity oriented managerial competences through experiential learning

Dr Victor Oltra & Dr Alejandro Escribá Esteve

Abstract

Acquiring sound managerial competences requires substantial practical training or 'learning by doing'. In this article, we present our experience in designing and implementing an active and experiential learning method to develop creativity-related skills among management students. Our main goal is to foster alternative teaching-learning actions that complement existing mainstream courses, focusing on developing strategic management skills that are extremely relevant in nowadays increasingly dynamic, complex and uncertain academic and business environments. This experiment involved students from different (management related) undergraduate and graduate degrees from the University of Valencia (Spain). Student participation was voluntary and the activity was developed under a non-academic, informal environment. Student teams had to propose not only creative, but 'crazy' and fun ideas, potentially applicable to the university or the workplace context. Many of these ideas, aimed at solving real (academic or business) challenges, involved really original and 'out of the box' – yet feasible – solutions.

Introduction: Developing managerial competences through experiential learning

A great amount of practical training or 'learning by doing' is essential for developing relevant competences that are necessary for fulfilling high-responsibility roles in business management. Aspects such as effective leadership and team management, a strategic vision, a critical approach to problem solving, and 'out of the box' thinking, can be highlighted as part of these competences.

Unfortunately, fully practical training activities around these aspects do not abound in most university curricula. This fact can pose a serious limitation to managerial higher education, since a strategic attitude and related managerial competences are essential for an effective contribution from higher education towards the society in terms of the availability and quality of dynamic and innovative (future) managers. In this sense, as graduates become managers, they can help transform the social-economic environment through high value-added, knowledge-based activities – an especially crucial challenge for countries crushed by recession such as Spain.

In this article, we present our experience with an active learning initiative to promote a strategic attitude and creativity-related competences among management students. We aim at fostering alternative teaching-learning methods that complement existing mainstream courses. A key purpose of this research is that original and 'crazy' ideas resulting from this classroom experiment can be directly applicable to (business) organizations. The experiment itself can be also adapted as part of organizational development and learning policies – whereby

employees can take the role assigned below to students.

Experiment planning and recruitment of participants

A few weeks in advance before the experiment was scheduled, a selection of the own (undergraduate and postgraduate) students of the authors of this article, coming from different courses and degrees, were invited by email to participate in the activity. Participation was voluntary and it was to be developed under a non-academic, informal environment. A 400 euro prize was also announced to be awarded to the best 'crazy' idea presented.

Out of the 22 participants, fourteen were students of the (European Higher Education Area adapted) International Business degree (from the first and the second years), five were students from the (old Spanish system) Business Administration degree (in their later years), and the remaining three came from other degrees (Labour Relations, double degree in Law and Management, and Master's in Business Strategy). This resulted in a relatively diverse group, both in academic background and also in age (18 to early 30s).

The experiment was scheduled for a four-hour evening session in March 2012. A seminar room was booked at the innovative, futuristic and award-winning (AIPC, 2012) Valencia Conference Centre (http://www.palcongres-vlc.com). A seminar room was booked there, in such a special off-campus location, so students felt really excited about participating in a radically different kind of activity, out of the regular classroom environment.

Experiment implementation

On the scheduled day, the participating students where met at the door of the conference centre and led to the assigned seminar room. The activity consisted of three parts: introduction and preliminary collective discussion, team working, and team presentations.

First, students publicly introduced themselves to the other participants. Then the purpose and dynamics of the activity were explained by the two lecturers involved. Students had to propose creative, even 'crazy' ideas to be implemented at the workplace (or at the university). These ideas were to help solve real business (or educational) challenges and required an effective application of essential managerial competences (e.g. strategic attitude, leadership, flexibility…). They had to be highly innovative and as much fun as possible on the premise that more fun always leads to more motivation. Simultaneously, the ideas proposed also needed to be relevant and feasible.

A real-life illustration of how fun, creativity and feasibility act synergistically to meet relevant goals, the 'piano staircase' podcast (The Fun Theory, 2012), was shown. This is an interesting example of how a fun idea can successfully change people's behaviour (more people use the stairs instead of the escalator after the former is 'converted' into a foot-activated giant piano). Businesswise, some examples were shared from the 'Out of Your Mind!' committee developed by the Brazilian company Semco (Semco, 2012a) – e.g. the 'Retire a little bit' programme (Semco, 2012b).

Immediately after this brief, intentionally theory-free presentation, the concept of strategic attitude was collectively constructed. Students spontaneously proposed features that would define such an attitude in managers, written in paper sheets and randomly placed in the classroom. Some examples were 'initiative', 'no fear of failure', 'getting away from conformity', 'anticipation', 'open mind', or 'everything is possible'.

The second part of the experiment started with team formation, randomly assigning students to teams, and then making adjustments so that no team had more than two students of the same degree and year. Five (four or five-member) teams were created, and were given some time to prepare their ideas. Each team freely chose the place to meet and work. Some went outdoors (it was a warm evening) to find inspiration in the convention centre gardens; others remained indoors, either in the classroom on in the hallways. All enjoyed the 'battery recharging' free refreshments available.

The third (and final) part of the evening consisted of the team presentations. Each team had to

present their 'crazy' ideas and persuade the rest of the class about their fun, relevance and feasibility. Presentations were fully video recorded. A synthesis of selected 'crazy' ideas that were proposed by each team is outlined next.

Experiment results: overview of the 'crazy' ideas presented

Each of the five teams presented their proposals of 'crazy' ideas. The teams had total freedom regarding the specific way in which they wished to deliver their presentations (regarding e.g. the use of IT equipment support or the interaction with the audience).

The first presenting team proposed many ideas, some intended for the university and others for businesses. Although this team did not use a slide set to support their presentation, it was quite effective at getting the audience interested. The ideas aimed at the university context included 'open classrooms' where students could teach each other, or class-wide team examinations (equal mark for everyone resulting from the class average mark). Regarding the ideas aimed at the workplace, a 'department of non-achieved dreams' was suggested, whereby the employer would help the employee fulfil his/her 'dream' (e.g. travelling to an exotic destination), also requiring some type of special work from the employee in return (e.g. working some time at a subsidiary in that destination).

The second team proposed a university-wide simulation project, as a kind of 'virtual world' inspired – according to this team's students – in Habbo virtual community (Habbo, 2012). There would be a legal framework, a central bank, financial institutions, shops, professional services, schools, hospitals, real estate agents, etc. Students could get 'virtual loans' to develop business projects, which would be rewarded with academic elective credits. It is interesting to note that the students of this team did not prepare a slide set. Instead, they carpeted the floor with paper sheets representing the building concepts and institutions of the virtual world proposed. They also got the audience really interested in their proposal.

The third team proposed two interesting ideas aimed at the university context. This team prepared a slide set as support for a more conventional kind of presentation. First, this team proposed a 'business farming' project. This initiative consisted of a simulation activity through which students would have to be in charge of a virtual business for a whole semester. Second, an optional course based on theatralization and role-playing was suggested. According to this proposal, students would have to creatively solve especially difficult challenges (e.g. 'going to the beach and selling a raincoat'). The audience was also quite interested in listening to these proposals.

The fourth team delivered a highly original presentation. In addition to not using any IT tools to support it, they decided to present from the back of the room. In this way, they emphasized their 'craziness' during the very process of presenting their 'crazy' ideas. This team proposed many ideas, mainly for businesses and some for the university. Among the ideas aimed at businesses, the following ones can be highlighted: department rotation linked to the obligation of proposing 10 new ideas at every new position, implementation of an 'upside-down day' at work (e.g. exchanging jobs and boss-subordinate roles), or a monthly 'costume day' (i.e. everybody going to work in fancy-dress). As for the university-oriented initiatives, these ones deserve special mention: a students vs. lecturers collective chess game (one alternative move per person of each group as they pass by), or a 'points programme' for students, rewarding certain goals and/or behaviour (getting in exchange elective credits, discounts at university shops, etc.). Definitely, this team raised a keen interest from the audience, from the very beginning when they decided to locate themself behind the audience, and throughout their presentation process.

Finally, the fifth team proposed an initiative for businesses: a social network where employees would develop their virtual avatars in a personal 'dream' (e.g. balloon globe circumnavigators or pop-stars). There would be help forums, personal spaces to share experiences, 'like' buttons, event announcements, tools aimed at better understanding the business and strengthening corporate culture (e.g. simulation games), and also means to help employees eventually fulfil

their dreams in the real world. This team used a slide set to support their presentation, drawing some interest from the audience on their (indeed attractive, although not especially original) proposal.

All in all, the five teams satisfactorily proposed a broad array of very interesting and 'out of the box' ideas (some 'crazier' than others), aimed at being applicable either for the university or for businesses. Both lecturers took notes during the presentations and carefully watched the video recordings. After a thoughtful and extremely difficult assessment process, the team that presented in the fourth place (the one that presented from the back of the room) was considered as the one that proposed the best 'crazy' ideas, and so deserved to be awarded the 400 euro prize. All participants were emailed when this decision was made, but they were not told about the outcome yet. Otherwise, they were summoned to a meeting in a seminar room (this time on campus), where the winning team was publicly announced. In the same moment, all students were given a participation certificate, and the five members of the winning team were given an award-winning certificate.

Conclusion

In this experiment, five teams of students – mostly undergraduate and with no professional experience – proposed very interesting and original ideas applicable to the workplace or to the university. Some of these ideas were 'crazier' than others, but all of them were highly relevant and feasible. All proposals shared a common assumption: employees/students who have fun will be more committed to their job/studies, involving 'win-win' outcomes. Further research may be inspired by this experiment, expanding the scope of the inquiry to other student profiles and/or to actual initiatives involving organizational development and learning dynamics.

Finally, the university-related proposals can be easily adapted to a workplace context (e.g. the students vs. lecturers chess game could be converted into a managers vs. non.-managers or dept./team A employees vs. dept./team B employees game). Definitely, these 'crazy' ideas are invaluable in societies needing deep social-economic change (e.g. Spain) towards new, knowledge-based models. Beyond the most immediate benefits for them (e.g. employee motivation and innovation), private and public organizations can crucially contribute to knowledge-driven social-economic change by embracing these 'crazy' ideas in all kinds of policies related to (individual, team and/or organizational) learning and development.

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Track 3: Creative management in a Higher Education Institution

Creativity cannot be expected to prosper in higher education without the intentional and determined efforts of the institutions. Thus creativity should be visible also in the management of higher education institutions. Consequently, this track concentrates on creative management practices, strategies and guidelines as well as on the implementation and success of them.

Music as the gate to Finnish culture

Mervi Friman, Erkki Korhonen & Marja Räikkönen

Abstract

Creativity is needed when a student group consists of young people from over ten different countries and four continents. And when the target of the course is to teach them Finnish culture - it is really a pedagogical challenge. This article describes the process of the course Seeing Finland through Culture which has been carried out in HAMK University of Applied Sciences (HAMK) three times. We describe the concrete process, reflect solutions from the theoretical and practical levels, and present the students´ feedback. This entire article is also examined from the perspective of creativity. In the first chapter, the formal frames of internationalisation in Finnish higher education, including the national targets and the activities of HAMK, is the setting. In the second chapter, the main idea and the most important principles are presented. The third chapter includes the content of the course and the following chapter the teaching methods. The fifth chapter presents the feedback material from the students. In this article we do not problematise the concept of `creativity´ according to different theories. In the conclusion we have collected the features which we have found to be creative in the process we have described.

Keywords

Internationalisation, culture studies, identity

Introduction

From the perspective of higher education, the ongoing globalisation process challenges institutions to strengthen contents and methods in order to promote international students´ survival in Finnish society and also to carry out their studies. The strategy paper of the Ministry of Education (MoE 2009) says that higher education institutions have to develop support activities for integrating foreign students into the Finnish work and living environment, and this requires sufficient skills and knowledge of Finnish society and culture. Also cooperation with regional actors is emphasised.

HAMK offers eight international degree programmes. Most of them are in the field of technology (e.g. Construction Engineering, Automation Engineering). In the academic year 2011-2012 there were 597 foreign students. Most of them were from China, Nigeria, Nepal, Vietnam and Russia. In addition to degree students, there are about 150 exchange students per semester. Many of them study in the Design programme.

At HAMK, the main principle in internationalisation is *responsibility* (HAMK 2011). This means not only the good quality of teaching and learning but the holistic care of the students´ welfare, e.g. support services in study guidance, practical training and employment. What does responsibility mean in practice at HAMK? Coping in Finnish society includes more than having good professional skills, knowledge, and a title. Of course the main task of universities of applied sciences is to organise the best possible education for their students. At HAMK this is monitored annually by the survey "Quality of teaching and learning" (given to all students N = 7000). In addition, there is a tailor-made survey for foreign students through which it is possible to find out more about their satisfaction

with studies and welfare in general. According to the results, foreign students are quite satisfied with teaching and learning as well as the campus facilities but they have difficulties in daily life: cold climate, expensive standard of living, unawareness of the functions of the local society, and shy Finnish people. The national surveys have given similar results: foreign students lack information about the structure of Finnish society and about opportunities to participate in local events and hobbies outside their studies (Koivisto & Juusola 2008, Kovalainen 2011). Also the student union has different kinds of activities that are focused on foreigners as peer students, tutors, and parties.

Idea and main principles

One option for the foreign students to understand `Finnishness´ is the course *Seeing Finland through Culture* (3 credits), which has been presented in HAMK three times (since the academic year 2009-2010). The aim of the course is to support the foreign students, especially the new degree students, so that they can integrate into Finnish society by getting familiar with culture. But since time is very limited, it is sufficient and realistic that the aims are as follows: to give the foreign students information and knowledge which are not in their formal studies and also to use more memorable methods than ones used in their other studies in order to help them to cope in Finnish society. (Dresser 2005, Vulpe & al. 2000).

From the perspective of the foreign student as a human being, far from home in a strange culture in the middle of weird people, it is important to make the context more understandable. In this process they can utilise their own past, the common presence, and the idea of the unsure future (Hall 1999, Koskela 2009). Stuart Hall´s theory of *cultural identity* accentuates the identity as an endless production. According to him, it is a continuous process and a series of reflections with other people and different surroundings. This kind of theoretical model is very suitable and fruitful for the course in which the forty students have their roots in very different kinds of cultures, they have very distinct life histories and now they are in the middle of something new and confusing which they can share. At the same time they are constructing their personal future by studying and at the same time continuously thinking whether they can survive in Finland, in the middle of Finnishness. The course gives the students elements through which they can build their identity in the direction of Finnishness or at least to help them better understand the character, structures, and activities of Finnish society and people, but still strongly keeping and respecting their own roots.

It is remarkable that the roots of the reasons for choosing Finland as a study place are in many cases "cultural". Foreign students know Finland as ´the Mecca of metal music´ or they know the wilderness or some famous architects or designers. These kinds of impressions have brought them to Finland. So, it is really worth emphasising the perspective of culture in their studies and using it as a gate to Finnish society.

The second main question is how to define and limit the phenomenon *culture* and how to justify the decisions. The very common definition of culture is that it is the collection of shared attitudes, values, targets, and practices which are typical to institutions, organisations, groups of people or nations. Civilization (or sophistication) can be seen as the ability to have know-how about culture and to have the ability to behave in the prevalent culture.

The task of universities of applied sciences in educating their students into culture and supporting them to become civilized human beings is under discussion. In traditional academic universities, it is still one of their main targets. But in the discourse concerning universities of applied sciences, the tasks linked to workplaces dominates the targets of education. The main target seems to be `safeguarding the work force´ (MoE 2008).

In the course *Seeing Finland through Culture*, the definition of culture is wide. It includes history, nature and daily life which are all three seen as the dialogical parts of the phenomenon of culture (Ahponen 2001). When understanding culture as a historically shaped construction and at the same time a daily reformed phenomenon, the everyday behaviour of Finnish people becomes more understandable and also questionable for the foreign students. The idea of the influence of national history and traditions in Finnish values and attitudes is strongly present in the course. (Uusitalo & Joutsenvirta 2009, Halonen & Aro

2005.) When we understand culture to be a historically shaped construction and a daily reformed phenomenon, it makes everyday behaviour and attitudes more understandable and also questionable. Therefore, the idea is to deepen the everyday, visible subjects and to try to find their meanings, reasons, and roots. This means also that the contents are strictly connected to the Hämeenlinna region, and thus the local area becomes familiar to the students.

The third principle is that every lecture has to be an *emotional experience*. This means that it is something exceptional compared to normal lessons. Non-verbal audible, visual and kinaesthetic experiences generate discussions at the emotional level in groups where nobody can use their mother language (Lappalainen 2005, Vilkka 2006.). Besides emotionality in teaching and learning, it is intended that the students feel that they have an easy, friendly and supportive time together.

Course content

To make *Seeing Finland through Culture* course more concrete, the programme of the course in the academic year 2011-2012 is presented below. The lectures were on Wednesday evenings (3 hours). The core group were first-year students of the degree programme in Construction Engineering (33 male, 2 female) and 8 exchange students (1 male, 7 female) of the degree programme in Design. In addition to them some visitors participated in the lectures. The core group students were from China, Nepal, Russia, Estonia, Ghana, Albania, Germany and Belgium.

18 October	Concert, Hämeenlinna Chamber Orchestra in HAMK Visamäki Campus (optional)
19 October	Finnish nature and its influence on visual arts, design, and music
2 November	Short history of Finland, Häme, and Hämeenlinna Culture and arts in the history of Finland and Häme
16 November	Understanding culture in an international organisation Visiting lecturer: Director (R&D) Mr Arto Ranta-Eskola, Rautaruukki
30 November	The Finnish composer Jean Sibelius (born in Hämeenlinna)
6 December	The Festival of Finland´s Independence Day (optional), Hämeenlinna Icehockey Hall
14 December	Finnish celebrations and traditions Special guest star Mr Jussi Wickström, Turisas Ensemble
25 January	"So Finnish" – values, behaviour and habits in daily life
8 February	Finnish design as a mirror of Finnish character Visiting lecturer: Design promoter Mrs Päivi Jantunen
14 February	Valentine's Day Event in Verkatehdas (optional)
22 February	Kalevala epos – the inspiration source of Finnish arts
14 March	Visit to Hämeenlinna Art Museum Hosted by the museum staff
25 April	Living in Hämeenlinna: Visit to City Hall and Sibelius Birthplace Hosted by Head of PR department Tiina Vahtokari

Students´ presentations: 21 March, 11 April, 2 May.

The timing of the topics followed the calendar, seasons, and annual celebrations. In this way, the students received information about upcoming holidays and traditional Finnish ways to celebrate them. Afterwards there were interesting discussions concerning e.g. Christmas or Easter, Independence Day or 1st of May.

Another topic, besides metal music, for students choosing Finland, was the uniqueness of Finnish nature: coldness, snow, freezing temperatures, darkness, and bright nights. Students can rather easily experience nature themselves but they

were eager to take part in common excursions to see the Nordic lights or blue moments.

History is easy to connect to Hämeenlinna by the old castle of Häme and as a topic it awakened interest among both European and non-European students. It is also rather a sensitive issue because of the somehow traumatic relationship between Russia and Finland. There was also some tension between Russian and Estonian students but this was always discussed openly. The EU also has many influences on the students´ lives and futures – the questions have been related to everyday problems, such as the euro, as well as the basic idea of the EU.

Last year, all the three visiting lectures were from the Hämeenlinna area. They represented two big companies (Rautaruukki and Iittala) and in addition to the main topic, students gained contacts for training places. The third guest, Jussi Wickström, was a special guest from one of the most well-known Finnish ensembles Turisas. Turisas is not particularly metal music but very near that. Jussi has made many long tours around the world and therefore was able to tell the students what Finnishness means to him personally.

The course also included excursions. Some of them were obligatory, guided, and free of charge, some were optional. Surprisingly, many students had music as their hobby and they participated eagerly in the concerts. Some of them have also found music groups and evening classes in Hämeenlinna (Friman 2011).

According to the students' own interests, they were also given hints on how to find literature, DVDs, and CDs to complement their studies. Also all the material of the course was saved in Moodle (in electronic form). The Kalevala epos raised great interest among the students.

Course methods

The lectures were strongly embedded in Finnish music, both live and recorded. The reasons for this are:

1. Music is the type of culture about which all students have opinions, personal experience and knowledge. As it was mentioned earlier, metal music was even an important reason to choose Finland as a study place.
2. As a non-verbal phenomenon music offers easily shared experiences
3. The expertise of the teacher (pianist and conductor)
4. Hämeenlinna's profile as a music city: the birthplace of Jean Sibelius, the most famous Finnish composer, many activities in the field of music in the city
5. High-level audio visual equipment in HAMK auditorium.

In practice, music was easily connected to every lecture: music has inspired designers and painters, music is a self-evident part of Finnish celebrations, and nowadays Finnish is an export product.

Beside the sense of listening, the sense of touch has been important (Halonen & Aro 2005). It has been possible to become concretely familiar with traditional Finnish craft products, such as birch bark shoes, design products such as Aalto vases and Kalevala Koru jewels, and actual hits from Marimekko and Globe Hope. The very traditional Finnish music instrument *kantele* (a string instrument of the zither family) raised great interest.

Because of very practical reasons - the late evening and three hours of lessons – there was a coffee/tea break between lessons. This break seemed to be a very important part of the course. During the break it was possible to reflect the first part together and to give the teacher pre-questions to the second part. Also the simple serving was somehow connected to the topic or Finnish traditions. Cooking tea and cutting bread with each other, and cleaning the tables together, were also a warm way to take care and enjoy a sense of community.

After all, the main didactic method is "place, time, space, and dialogue". The enormous quantity of information is hidden behind e.g. the topic of Finnish history or Kalevala. However, the main principle is to find the relevant points which make the issues understandable, concretely lively, understandable, and for utilisation in the students' daily life (Crawford & Bethell 2012). This process needs time for processing, space for thoughts and dialogue with the teacher and other students. To create and maintain this

atmosphere makes learning fruitful and supports the studies. Normal student life is very busy and dominated by deadlines and the intention was that these evenings give student a break to breathe and also wonder about everyday problems together. Often the problems dealt with the behaviour of Finnish people, manners and attitudes. When the students gained knowledge about the history and traditions, the problems began to disappear. (Aaltonen 2007.) For example the use of alcohol has been difficult and even a shameful issue among the foreign students. The history and even examples of drinking songs opened the problem in a new and fresh way.

Students' contribution

As an assignment, the students prepared in small groups (2-4 persons) a presentation with slides (and videos, music…) about some cultural phenomena of their own country and made a short comparison to the Finnish one. The topics have included classical music, photography, modern architecture, traditional construction etc. As it was mentioned earlier, year after year students have been fascinated by Kalevala and kantele. Every year there have been presentations about national, traditional stories or mythology and also musical instruments and their development.

The theory of Hall is realised in presentations: the students' own traditions and history are reflected in the Finnish one. Through the presentations the pride of one's own roots can be heard and, by the students own words, they have become more conscious of their own traditions when making the presentation (Koskela 2009).

In the feedback of earlier courses, the students gave thanks to the opportunity to participate in concerts, visit museums etc. Therefore, it has become more and more important to make it possible for students to take part in easily accessible cultural events. When students use local cultural services, they become integrated into the region and also, hopefully, this gives them new networks outside the university.

Hobbies are a remarkable way to become attached to the Finnish society and thus to understand it better and also to get contacts outside of HAMK. Students often spend too much time daily among each other, so all kinds of attempts to push them into contact with outsiders are important. Networks outside HAMK are also very necessary when looking for work placements or employment.

Conclusions

Consequently, what and where has creativity existed during this course? When defining creativity very simply, it means the ability to change the usual perspective from which the topic is regarded. Creativity is also an ability to combine the pieces of the issue in new ways so that the new solutions will be found. (Csikszentmihályi 1990, Anttila 1992.) When talking about creativity in the context of pedagogy, the teachers' sensitivity to react to the students' attitudes and desires, their capacity to motivate different kind of students and to encourage them to take risks are stressed.

We can go back to the three main principles in chapter two and take a look from the perspective of creativity. It can be said that in the whole process of this course, there are three main challenges in which creativity is imperative

1. to define and concretise the concept of culture
2. to construct an interesting wholeness
3. to support the personal growth of the students.

Firstly, the path from the official targets of the Ministry of Education and Culture to the daily life of foreign students is long. When the strategy states that the higher education institutions have to support the integration of foreign students into Finnish culture and society, Finnish culture has to be seen from the perspective of the outsiders – young people from very different origins. Foreign students are not a homogenous group but a group of enormously different human beings. So, culture as a phenomenon has to be limited, simplified and embedded in visible forms. It is impossible to handle culture in its entirety but it is possible to help to take the very first steps and give advice for the future.

Secondly, again because of the very heterogeneous group of students, the course has to include versatile materials and events. As it was mentioned, music combined, but by itself it

is not enough. In the feedback questionnaires, the best memories were the "blue moment", which means standing in the freezing cold schoolyard and looking at the sky, or eating fresh cinnamon rolls. A very positive matter was the contribution of the students during the courses: they gave suggestions and offered themselves to take responsibility for some parts of the lectures.

Thirdly, students need, at the same time when teaching them Finnishness, encouragement to maintain their own origin national identity. Foreign students have so many valuable traditions to share with us and therefore it is worthwhile to support them so that they can introduce these to Finnish students. Foreign students have pressure to adopt themselves in our culture but it is not only in that way but also vice versa.

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Creative sport events in shaping the image of a higher school

(on example of the Jerzy Kukaczka Academy of Physical Education in Katowice, Poland)

Justyna Maciąg, Radosław Folga & Agnieszka Smykla

Abstract

One of the appreciated PR tools for shaping a school's image is organising various special events such as conferences, shows, exhibitions, sport, cultural, charitable e.a. events. The aim of this paper is to analyse of the use a sports event to change the school's image in its internal and external environment (on example of the Academy of Physical Education in Katowice). The results of analysis allows to conclude that running events organized by the Academy helped to improve primarily the school's relationships with the city and province authorities, integrated sports clubs, distinguished the Academy on regional, national and international levels.

Keywords

Higher school, sport events, creativity, image

Introduction

Operation of a higher school on the contemporary market of educational services is characterised by high competitiveness. The schools compete against each other and against other subjects for clients and indispensable to render educational and scientific - research (human, financial, material and informatics resources) services supplies. Using the same resources (e.g. hiring the same lecturers) and standarisation of educational services (e.g. close or identical schools' names, directions, education curricula) make schools and their offers more and more similar, especially within the group of schools with similar education faculty. Hence source of competitive advantage on the educational services' becomes creation at school unique and long-term, profitable relations with its partners (the state, employers and other subjects of labour market, students, scientific – research subjects, branch organisations, local community, employees etc.). Foundation of these relation is made of commonly created value based on trust, quality, communication, commitment, satisfaction and reputation (Drapińska 2011). Reputation, that is image and identity of the school is an important element of relation management in educational services. It allows the school to distinguish itself and emphasise its uniqueness, it is also an important factor deciding which academy will be chosen by the student. That is confirmed by researches conducted amongst the students in Europe which state that 82% of respondents refer to academy's reputation and its programs when choosing the school (in Poland the figure is 94% accordingly) (Students and higher... 2009).

Using the tools of marketing communication, including public relations the academies expose their uniqueness, specialty, creativity and entrepreneurship in areas of activity important when creating desired image in the environment. One of the more and more appreciated by schools tools are so called 'events'.

Aim of this article is to present results of the researches concerning usage of sport events to change and creation of a new school's image (exemplified by the Jerzy Kukuczka Academy of Physical Education in Katowice).

Literature review

Literature of the subject notices that image category should be seen from a broader point of view – in the context of school reputation (Drapińska 2011, p. 213). Researchers Yang, Alessandri, Kinsey (Yang et al. 2008, p. 146) defined reputation as collective picture of the university existing in consciousness of various subjects from its environment – partners both external and internal, including the media. Reputation is an effect of many years of actions, key factor of success on the education market, created by academy's identity and image.

Identity of an academy (corporate identity) encompasses a set of features enabling it to be distinguishable amongst other subjects. Academy's identity is described by its statute, organisational structure and educational offer, seat and placing, quality of education, academic ethos, academic traditions, scientific researches and co-operation with research environment, position in competitive environment, economic conditions of studying, system of visual identification and aspects of students' life (Zacłona 2010, p. 262). Picture, however, in common meaning stands for portrait, image, subjective imagination of an idea, object, person, state, company, material products and services, natural, social and economic phenomena. According to Kotler, the image is a set of beliefs, thoughts and impressions of a given person concerning an object (Kotler 1994, p. 549). It is the way in something is being perceived. The image is an effect of processing information concerning prior registered pictures. Recipient's personality features, circumstances of time and place and transfer character give those picture specific for given person shape and meaning. Szromnik states that at that moment comes into being specific conglomerate consisting of feelings, judgments, opinion, positions and facts (Szromnik 2007, p. 133). Huber adds that the image is a multi-layer creation, being sum of all perceptions and observations where we project our ego. A man records certain objective pictures but his subconscious gives them exceptional meaning (Huber 1994, p. 24). Hence the phenomenon of arising different images of the same object.

In the light of adduced definitions school picture can be characterised as subjective, relative and heterogonous. The image is subjective due to the fact it is not a true reflection of reality, its individualised and subjective character create both true and false images, positions and experiences of all the related with the academy ones, directly or indirectly (Zacłona 2010, p. 259). Image heterogeneity sources from perceiving dimensions in which the school functions in the scope of fulfilled role: as a teacher, a creator of science and culture, a moral authority, an employer, a subject supported financially and an investor (Iwankiewicz-Rak 2006, p.96; Waszkiewicz 2011, p. 72). Relativity of the image comes from the fact that academy's image comes into being in relation to academies known earlier and image of the whole higher education sector (Zacłona 2010, p. 260). Therefore the image is a resultant of processes within the school, its condition, fulfilled functions and relations taking place between the school and its environment – partners.

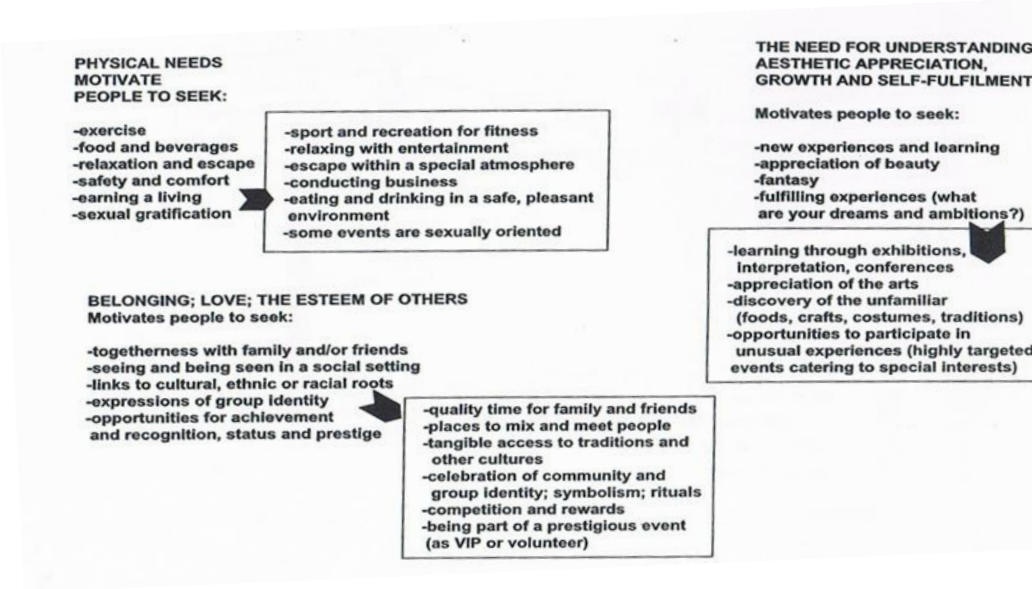
Due to the mentioned features the process of creation of desired image in partners' consciousness becomes a big challenge for a contemporary higher school. The point of origin in image management is realized by the school market strategy (Kolasiński, Lisiecki 2004, p. 244). It determines the methods and tools of construction, modifying and preserving the academy's image on the market. The process of shaping the academy's image is realized by the means of a number of tools, shaped in the structure of traditional marketing-mix where special attention should be paid to the promotion tools (promotion mix or communication mix). Promotion mix fulfills two basic functions: informative and spurring (Lewandowska 2008, p. 129). Informative function is to get the partners in the know with school conditions and

activity whereas spurring function is to induce such positions and behaviour that prompt to embrace school offer. To the main promotional instruments used by the school one can count: advertisement, personal sale and public relations. Special meaning in shaping academy's image possess public relations (PR).

Public relations are defined as planned and constant activity which purpose is to establish and keep mutual understanding between the organisation and its environment – partners (Payne 1996, p. 200). The aim of PR is not to sale educational services, but creation, maintaining and improvement of academy's image in its environment. Wójcik stresses that academies take action of PR type out of three main reasons: realisation of independent communication targets, taking PR type action as exploitation of all the chances in creating optimum conditions for development and competitiveness and support of marketing targets (Wójcik 2005, p. 184). Within the first of listed zones one can distinguish actions such as: presentation of academy's mission, references to academy's history and traditions, references to personnel, student's successes, alumni, famous lecturers, creation of informative platform (website, exchange forum for ideas and opinions), information on changes and investments, information on researches, presentation of financial condition, correction of critical information, spreading information legitimising the academy as a socially responsible subject. To the second zone one can count: influence on understanding the organisation by its environment, creation and spreading of immaterial assets and co-creation of organisational culture. The group related to marketing target support consists of activities such as: realisation of services image strategy, support for school services promotion, product placement, presentation performances, open days, taking part in fairs and creation of positive climate for promotional and advertising action. One of important conditions of effectiveness for actions regarding shaping desired school image in its environment is right choice of PR tools. Contemporary public relations offers for academies broad spectrum of forms and tools of edification with partners. There are, amongst many, those worth special attention to be paid for, connected with interactive participation. Undoubtedly, these are events and happenings of all kinds.

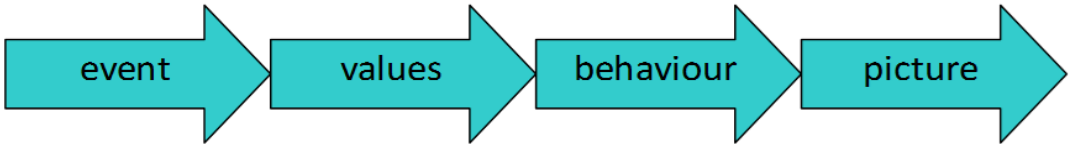
Happenings are events designed to communicate certain information in stated place and time (Getz 2007, p. 18; Kotler 1994, p. 586). Apart from realisation of informative function the event is also to induce positive emotions amongst the school partners and deliver expected values. Event's value is a benefit obtained by school partners through having their needs satiated. In relation to the theory of needs by Maslow Getz distinguishes three basic categories of needs: physical needs, need of belonging, love, the esteem of others and the needs for understanding, aesthetic, appreciation, growth and self-fulfilment (Getz 2007, p. 331). Needs, motives and benefits offered by events are present on picture 1.

Picture 1: Needs, motives and benefits offered by events. Source: Getz D. (2007) Event Studies. Theory, Research and Policy for Planned Events. Elsevier Ltd, p. 331.



Through answering the needs, giving the events sense and filling them with appropriate content are transferred values influencing school partners' behaviour, and in effect its picture. The process is illustrated on the picture 2.

Picture 2: Event as basis to create positive picture. Source: Own elaboration.



In the literature it is stressed that recipients of the values are not only direct participants of an event, but one can also count such subjects from the school environment as: (Getz 2005 p. 55):

- customers and potential customers;
- volunteers and staff;
- suppliers, performers, and other participants;
- agencies providing grants;
- corporate sponsors;
- participating organisations (i.e. partners and allies);
- the media;
- local community/residents;
- social and environmental lobby groups;
- governmental agencies at all levels.

Therefore an event in short period is media news, its purpose is to turn attention to the school and its action. In longer term the event becomes an import ant tool to create values and build desired academy's image.

Literature of the subject stresses that in order to be an effective tool to create positive school image, the event has to fulfil following conditions (Florek, Proszowska-Sala 2010, p. 203; Wójcik 2005, p. 184):

- possess interesting potential, be interesting for the recipient;
- to be based on recipient's interactive participation; he will be taking part, action and gaining experience;
- offer memorable impressions and experiences;
- to make the recipient feel special and willing to come again;
- to build loyalty i.a. through periodic and joining with another events;
- to be congruent with marketing strategy, including school promotion and its identity.

At present spectrum of events organised by higher schools is very well developer. One can count into it (Bowdin et al. 2006, p. 17; Getz 2005, p. 19):

- cultural events;
- arts and entertainment events;
- educational and scientific events;
- sports and recreational events;
- political and state events;
- business and trade events;
- charity events.

The events are realised in various forms: open days for candidates, knowledge and skill contests, meetings, conferences, shows, exhibitions, sports championships and others. In order to distinguish their offer schools reach to more and more creative ways of using events in shaping their image. According to Green creativity in this area can be defined as ability of a person to create something new by juxtaposing two or more different elements in a new context in order to obtain additional value in specific project. Creative activity consists not only of raising added value but its valuation as well. It cannot be a novelty itself – it must offer some value identifiable by other people (Green 2004, p. 24).

Results of researches conducted at the Jerzy Kukuczka Academy of Physical Education in Katowice are presented below. They show how

effectively a creative sport event can be used to change academy's image in its environment.

Methodology

Academy of Physical Education (APE) in Katowice was founded in 1970, since 2008 it bears the name of born in Katowice Polish famous mountaineer Jerzy Kukuczka. To celebrate this fact, since 2008 there has been organised a unique running sport event named "The Kukuczka's Running". Currently, it has the form of a year-round sporting event consisting of:

1. The "Katowice's Running Festival" which is held once a year, it includes:
- "The Kukuczka's Running"- a distance of 42,195 meters;
- "The Children Relay Running" at a distance of 115km 876m – a distance is the sum of all eightthousanders on the Earth, which were taken by Kukuczka;
- "The VIP Running" over a distance of 2 km;
- The Polish Championships in 24 Hours Run 24 and The 48 Hours Run.

2. Monthly running events: "Speed Crown of the Himalayas", "Wild Panewnicki Halfmarathon".

All events are subject to the patronage of the city and voivodeship authorities. The events were attended by Polish and foreign athletes, officials, olympic athletes (Justyna Kowalczyk –ski runner, World Cup winner, an Olympian, Sylwia Jaśkowiec – ski runner, participant of the Olympic Games 2010, Tomasz Sikora - biathlonist, participant of the Olympic Games 2006, 2010), Silesian companies' authorities and Academy staff and students. During sport events there are organised charities, social campaigns and concerts.

The study aim was to analyse the impact of organised sport event to change the image of Academy of Physical Education in Katowice. In the study the following research problem was formulated: Did creation of a unique, cyclic, international sporting event help to change and build positive Academy image in its internal and external environment?

Presented hypothesis stated that: the sports event is an effective tool in shaping and improving the school image in the environment. There were following research questions formulated:

1. Has the sport event organisation changed the Academy's image and improved its relationships with its external environment?
2. Has sporting event changed the Academy's image in the eyes of employees and students?

Methods of desk research and technics of questionnaire and observation were used in these researches. The survey was conducted among participants of "The Katowice's Running Festival":

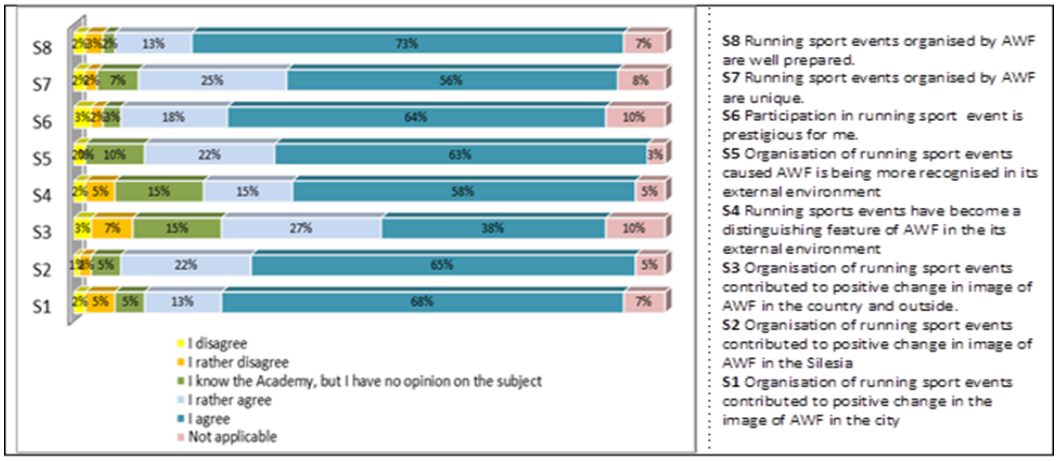
- runners (originating from poland and other countries);
- students of academy of physical education in katowice;
- academy's emploees;
- authorities of city Katowice and Zabrze;
- representatives of Polish Association of Athletic;
- famous sportsmen - olympians;
- representatives of academy's authorities.

Results of researches are presented below.

Results

The researches amongst the runners were conducted in 2011 and 2012 during organized running events from the cycles "Speed Crown of the Himalayas" and "Wild Panewnicki Halfmarathon". In the research took part 61 runners from Poland, Lithuania, Belarus, Slovakia and Ukraine. The participants were asked to evaluate the following statements concerning academy's image (chart 1).

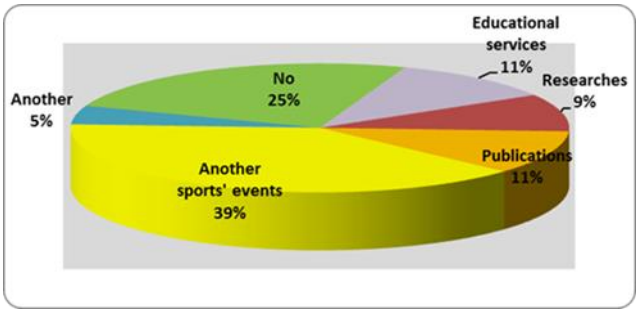
Chart 1: Valuation of the Academy of Physical Education in Katowice made by runners.



Results of the researches point out that 84% of runners valuated positively the APE's in Katowice image before committing the start in running events. Taking part in the event caused 10% of people who perceived the academy's image as negative changed it to better. As a majority the runners confirmed also that organised events influenced better perception of academy's image in the city (68%) and voivodeship (65%). To the lesser degree the runners think the organized events influenced change of the Academy's image in the country and internationally (38%). Over the half of the respondents presents the opinion that the APE began to distinguish itself from other Academies and the running events became the Academy's trademark.

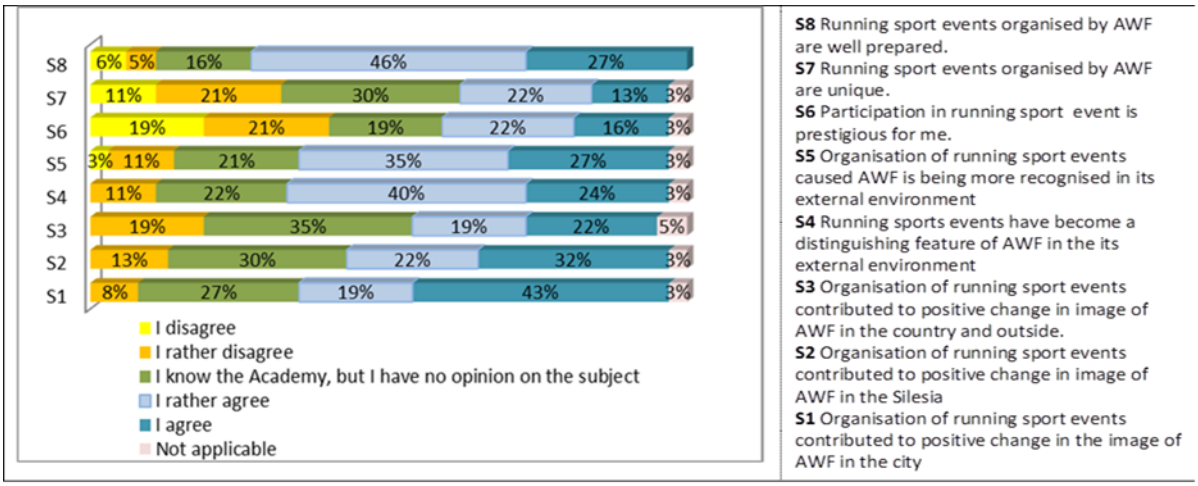
Participation in the running events resulted in growth of runners' interest in educational, publishing, research offers and participation in other sport events organised by the Academy (chart 2).

Chart 2: Runners interest in the offer of the Academy of Physical Education in Katowice



Researches on students were conducted on persons who participated in running events as runners and volunteer. Just like the runners, the students were asked to evaluate statements concerning academy's image. (chart 3).

Chart 3: Students' valuation of the Physical Education Academy in Katowice.



The results of evaluation depend on each statement. In majority the students agreed that running sport events organised by Academy improved the image of school in their national and international environment, and events became some king of Academy's brand. 70% of students evaluate sport events positive. 84% of students evaluated positive the Academy's image, before they had started in such event, 11% had no opinion in this subject. 47% of students claimed that participation in running events didn't change their opinion about Academy's image, 44% of students changed their evaluation of opinion for better, 10% - for worse.

Employees were also asked to evaluate statements related to Academy's image. In majority they agreed that running sport events organised by the Academy are unique, improve the image of school in its national and international environment, and events became a kind of Academy's brand. All of the examined employees of Academy evaluate sport events positive and claimed that participation in running events changed their opinion about Academy's image for better.

To the researches was addend an interview made with the representatives of local authorities (Sławek Witek Katowice City Hall, Bartek Bober Zabrze City Hall), Polish Association of Athletics (Augustyn Jakubik) and olympians (Sylwia Jaśkowiec – an olympian in Cross-country swing – Vancouver 2010). Respondents' opinions are presented below.

Sławek Witek Katowice City Hall: *Organisation of running events cycle has changed through AWF's image perception of the city of Katowice as runner friendly, hence sport promotion friendly. The same reason has caused AWF more recognisable for city's inhabitants. It is very hard to point coefficients determining rational benefits coming out from organised races. For sure one can encounter broadening of sport events palette (including active relax) in the city of Katowice which is represented in the events calendar. Therefore, organised running events are a strong positive element of prepared Strategy of Sport Development for the city of Katowice. One should mention that due to its broad activity on the area of Katowice AWF has found its well exposed place in the aforesaid project. The present image of AWF related also with students' achievements I evaluate as very good.*

Bartek Bober Zabrze City Hall: *Organised running events surely had positive impact on positive perceiving Academy of Physical Education in Katowice as a partner and solid organiser of such events. Without doubt running events are used to propagate physical culture, active lifestyle in free time. They turn our attention to health area of physical effort. Running events are used to promote the academy, city and region, they gather participants who, in order to take part in them have to come there hence pay a visit to said city/region.*

August Jakubik, one of the running events founders, Polish Association of Athletics: *The public in majority had no opinion regarding the Academy, perceiving it as any other in the city,*

available only for its listeners. [Running events] visibly brought the Academy closer to people not related with it. The Academy has become more recognisable and society-friendly. Figure of the Academy's Patron by the means of organised „Running Crown of Earth and Himalayas" has became presented closer to the public. Many people have taken part in their first marathon run ever, owing thanks to AWF Katowice for enabling them participation on sport, without any significant costs. Many students decided to practice running thanks to periodic running events. Thanks to those events Katowice were visited numerous times by people from all the country and from Belorussia, Czech Republic, Slovakia and Serbia. Our region is associated with support for mass events. Recreational character of many events) allows people who have never been running before to try their chances and many of them sticks to that healthy life style permanently. One can run regardless the age and sex – this method of preventive health treatment is decisively more effective than any informing action. This course of action should be encompassed into the regional development strategy in order to allow bigger group to spend their free time with sport. There is no other academy in Poland which organises running events by itself with such frequency and rank (Championships of Poland in 24 hour run, in proximity World Championships in 24 hour run. The academy realises its mission promoting development of physical culture amongst its listeners and city and region inhabitants as well. .

Sylwia Jaśkowiec – an olympian in Cross-country skiing – Vancouver 2010: *Without doubt, such events has had positive impact on the Academy's image, even if considering the fact of interest the media pay to the academy which promotes active ways of spending free time. In sport and amateur environment there are often mentioned contests organised in Valey of Three Ponds by AWF Katowice and announced as „worth seeing". I think the number of participants alone speaks for big interest of runners themselves and positive comments regarding technical organisation of the games.*

Results of conducted researches unequivocally corroborated the thesis that creation of a unique, periodic sport event as "The Katowice Running Festival" had positive impact on Academy's image change in its environment. The event allowed to build profitable relations with Academy's partners – city authorities, sport community, runners, employees, students and local society. The respondents pointed also out that "Katowice Running Festival" and periodic "Speed Crown of the Himalayas" and "Wild Panewnicki Halfmarathon", have become a trademark of the Academy and are of unique character.

Conclusions

An expression of the Academy's creativity and entrepreneurship was creation of a unique, cyclic sport event which helped to change and build positive perceptron of its image in both internal and external environment. Existing earlier problems with corruption, financial troubles and Academy's tendency to isolate itself from its environment influenced negatively the contacts with city and voivodeship authorities, other academies and sportsmen environment as well. The adverse academy's image was proven by the fact that candidates for studies (especially from Katowice and its surroundings) having choice of five sport academies in Poland of ten chosen sport academies in Wrocław or Kraków.

Difficult inner situation of the Academy and its adverse image in its environment required application of PR tools in a new, creative way to allow it to expose its potential, entrepreneurship and uniqueness in the areas tightly connected with its mission in the sphere of education and researches for sport and education.

"The Katowicki Runner Festival" is an event of sport nature which came into being as a result of unprecedented connection of such elements as: organiser – the higher school, way of realisation and cyclic character of the event (annual "The Katowicki Runner Festival", monthly running events that is "Speed Crown of the Himalayas", "Wild Panewnicki Halfmarathon"), accompanying events – charity, cultural, contests etc. in a new context, commemoration of a luminary Polish mountaineer, coming from Silesia Jerzy Kukuczka. Obtained results confirm that organization of the running event allowed to create an additional value in relations between the Academy and its partners. Benefits for the Academy result mainly in growth of interest in didactic offer and improvement of relations with city authorities, sport environment, employees and students. The Academy became more prestigious and is more often chosen by the

candidates for studies during the recruitment process. It is confirmed by high, 11th place taken by the Academy in the ranking of Polish Academies the most frequently chosen by the candidates for studies, made by the Ministry of Science and Higher Education in 2011 (the first place in Silesian Voivodeship, and no other sport academy in the country outrivaled APE in Katowice) All the running events and organisational effort of the academy were noticed by IAU (International Association of Ultrarunners) which granted to the Academy organization of the IXth World championships in 24-hour run and XVIIIth European Championships in 24-hour run in 2012. The students obtained benefits of possibility to participate in the event (as a contestant or voluntary), the runners and their environment enjoy popularisation of running, integration of their community, health, answering the need for sport rivalry, for the city – realisation of the sport and recreation development strategy in the city and region, city promotion through organisation of national and international running events (Championships of Poland, Europe, World). The foundation of these relations is commonly created added value based on trust, quality, communications, commitment and satisfaction. The aforesaid statements give right to claim "The Katowicki Running Festival" the creative sport event. In appreciation for sport events as tool to shape the academy's image other academies, take an example from the Academy, i.e. Silesian University in the next year intends to organize a series of marathons called "The 4 Seasons".

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Organisational determinants of students' creativity stimulation in the higher school

Justyna Maciąg, Luiza Mańkowska-Wróbel & Krzysztof Dziurzyński

Abstract

To improve the quality of educational process it is necessary to understand the determinants of students creativity. The aim of this paper is to analyse organisational determinants which stimulate students' creativity and to present results of researches performed in this area. The test results showed that students think of themselves as creative people. The majority of students estimated that the school stimulates their creativity mainly through the teaching process (projects, analyses, presentations etc.). Test results indicate also low interest in other forms of student activities during the studies (student organisations, scientific groups, sport organisations, voluntary services, participation in training events and other activities). Students indicated also barriers of their creativity: objective, subjective and psychosocial ones. Obtained results allow to confirm the hypothesis formulated in this research. Tested schools take various actions in order to stimulate students' creativity, but these are often insufficient and do not match their expectations.

Keywords

Creativity, higher education, quality

Introduction

The XXth century brought great change in approach to comprehension and shaping man's creativity. Growing complexity and dynamics of life environment, formation of post-industrial society (described also as society of knowledge, information society, planet society) and raising of a new social class – class of creators resulted in taking intense actions allowing to understand and rationalise man's creation. As Szmidt points out when at the beginning of the XXth century examination of creativity was equal to stepping into magic zones (creation was initially domain of the God only, later of great artists – Author's rem.) then at the end of this century creation became a phenomenon, a recognisable disposition subjected to education (hence possibility to get it launched and developed by the means of educational actions) (Szmidt 2005, p. 19). The problem of shaping student's creativity was broached in many international documents setting prospective directions of education development, i.a. in the reports by E. Faure, J.Delors and UE White Paper (Rabczuk 2000, p. 322 – 323), The Bologne Declaration, the Recommendations of the European Parliament and of the European Council (Recommendation… 2006). It is emphasised in all the documents that the challenge for a contemporary higher school lays mainly in preparation of the students to brave unexpected situations and creatively shape the future, to develop ability of independent and creative thinking, independent judgments, indispensable in circumstances of bigger personal responsibility for shaping the contemporary world. That poses new challenges in scope of education process

quality management in a higher school. Higher school must organise the process of education properly to ensure these attributes are actively pursued by the graduates.

The aim of this paper is to analyse organisational determinants which stimulate students' creativity in the higher school and to present results of researches performed in this area.

Literature review

At present, problems of creativity due to their momentous role in an individual, socio-cultural and economic aspects as well are widely approached both scientifically and practically. Taking into consideration the fact that several definitions of creativity exists in the literature there is a need to define the notion in educational context.

Some of the researchers of these aspects clearly distinguish between creativeness and creation. With such an approach, creativity is defined as an expression of certain „ potentially creative activity" it is an individual feature, a style of psychological functioning, characterised by determined attributes, i.a. openness and cognitive curiosity, ambiguous tolerance, inside motivation – constituting relatively imperishable ability of an entity to create new ideas or solutions (Stasiakiewicz 2002). With such an approach creativity is creation without works, ability to create without any specific effects of creation (Sloane 2003, p. 17), man's disposition to widely understood creativity, more comprehended as self-realisation, autocreation, defined by Maslow as self-actualised creativity (Maslow 1990). Autocreation is directed to the entity's inside, on one hand it is the entity's process of self – determining and self-honing, on the other one it is a process of purposefully influencing of self – development by adequate regulation its relations with milieu (Wojtczuk – Turek 2010, p. 50). Creation, to be distinguished from creativity, characterises those actions of the entity which lead to specific effects recognised as valuable in given area.

It's also possible to find in the literature of the subject views of authors who take creativity as creation's synonym – creation is creativity understood personally as action or stance of a creative man (Szmidt 2010, p.10). Creativity is an attribute of the man whose activity brings valuable novelty. Barron suggests that creativity is about bringing 'something new into existence purposefully', and that this 'something new' is 'usually a product resulting from a process initiated by a person.' A recent interest in creativity research is the potentially enhancing influence of context on product, process or person (Bleakley 2004, p. 464).

Such definition of the creativity notion was also adopted in education. In the Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning (Recommendation… 2006) creativity is described as a feature characteristic for an innovative and operative man who is able to create or use the changes in order to effectively manage the organization. Sense of initiative and entrepreneurship refers to an individual's ability to turn ideas into action. It includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives[1].

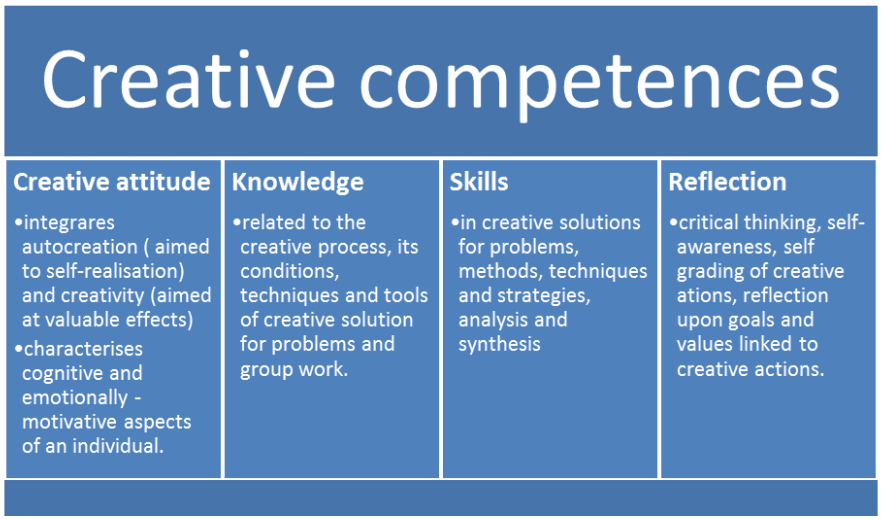
Essential knowledge, skills and attitudes related to this competence include:

- Necessary knowledge - the ability to identify available opportunities for personal, professional and/or business activities, including 'bigger picture' issues that provide the context in which people live and work, such as a broad understanding of the workings of the economy, and the opportunities and challenges facing an employer or organisation.
- Skills related to proactive project management (involving, for example the ability to plan, organise, manage, lead and delegate, analyse, communicate, de-brief, evaluate and record), effective representation and negotiation, and the ability to work both as an individual and collaboratively in teams. The ability to judge and identify one's strengths and weaknesses, and to assess and take risks as and when warranted, is essential.

RECOMMENDATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 on key competences for lifelong learning30.12.2006 EN Official Journal of the European Union L 394/17

Looking at creativity as one of the key learning outcomes obtained during the process of education forces necessity to take actions at schools, aimed at support and shaping broadly understood creative competences of the students. The problem of education for creation , a process of 'learning the creation' is more and more discussed in the literature. Creative competences of an individual encompass: creative approach (creativity and autocreation), knowledge, skills and reflection (pic.1).

Picture 1: Creative competences
Source: own elaboration based on : Wojtczuk – Turek A., Rozwijanie kompetencji twórczych. Publ. SGH. Warszawa 2010, p. 61-63.



Presented definition of creative competences shows that creativity, as an integral element of student's creative attitude is a derivate of his/her personality features, ability and attitude and external stimulations and conditions created by milieu in which he/she acts. The researches upon creativity emphasises very strongly role of external factors. The factors of external milieu determining student's creative attitude one can encounter (Schomburg, Teichler 2008; Bielecki 2011): socio-cultural conditions of country and region, labour market conditions, globalisation, internalisation, knowledge society and socio-, psycho-biographic background (parents education, prior education). Special meaning in shaping creativity is assigned to family and school environment. Therefore the process of shaping creative attitude of the student at school should encompass actions of triple meaning (Andrzejewska 2005, p.31):

- subjective – including individual characteristics and developing personal supplies (mind properties, personality, specific gifts) and supporting the student in the process of self-development (autocreation);
- objective – referring to organisation of education process in such way that it includes creative task solving related to actual problems of social, technical, utilitary, scientific etc. nature, enabling the student to experience reality in real and tangible conditions;
- social – referring to support of team activity and group forms of participation in creation, creation of right environment stimulating creativity.

Effect of educational edifies of subject nature developer individual resources through acquiring and intensification of a number of skills of a student related to functioning (Niedzielski, Rychlik 2006, p. 187; Wojtczuk – Turek 2010, p. 59):

- in the aspect of interpersonal relations: openness, effective communications, emotional intelligence, ways of behavior in case of group pressure, tolerance;

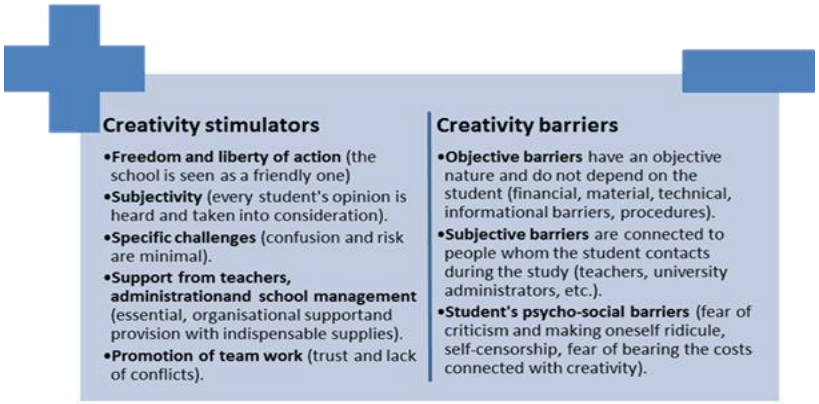
- cognitive: intellectual independence, reconstructive and reasoning learning, divergent thinking, intellectual flexibility, constructive imagination, cognitive activity, originality;
- in the aspect of task sphere: adaptive elasticity, consequence, bravery, self-organisation, expression, resistance, stamina, feeling of self-effectiveness;
- motivation dispositions: task motivation, achievement pursuing, initiative, optimism, involvement.

In recent years plenty of researches were conducted in order to present a set of personality features attributed to creative persons. Despite individual differences characteristic features were distinguished. These are (Drozdowski et.al. 2010, p. 43):

- open-mindedness, that is tolerance to information unsure, contradictory, awkward which does not mean to accept them without any criticism but to ponder them with care;
- strong inner motivation characterised by assiduous and pertinacious problem solving; main reason for work is cognitive curiosity and satisfaction connected with solving the problem whereas material gratification is of minor importance;
- independence in thinking and action; creative people are non-conformists, they act in accordance with their own conscience, they submit so harder to the pressures from the group they function within;
- positive relation to themselves and feeling of their own value and dignity;
- preference of moderate risk;
- moderate criticism, that is ability to evaluate state of scientific knowledge, big care when accepting new hypothesis and theories, no submission to fashion and adds pressure;
- feeling of destiny, sense and value in relation to one's work;
- broad interest in branches of knowledge other than professional ones.

Shaping students' creativity takes place through the whole of educational interactions at a higher school, encompassing education process, (teaching - learning process, curricula, methods and tools of education), actions taken apart from the process of education (study conditions and provisions, student organisations, other student's actions) and creation of adequate environment favoring creative actions undertaken by the students. It is postulated that contemporary school should be creative, open and interactive with its milieu, innovative, entrepreneurial and future-oriented (Banathy 1994, p. 112-125; Pluta-Olearnik M. ed. 2009, p. 7). The school becomes an organiser and co-ordinator in the knowledge and skill gaining process, at the same time motivating the students to take active part in the process of getting and broadening their own creative competences. Researches conducted in various organisations including schools allowed to determine the set of factors favoring and stopping creative behavior of individuals (pic. 2).

Picture 2: Stimulators and barriers of creativity in the higher school.
Own elaboration based on: Niedzielski P., Rychlik K., Innowacje i kreatywność. Pub. Uniwersytet Szczeciński, Szczecin 2006, s. 189; Drozdowski R., Zakrzewska A., Puchalska K., Morchat M., Mroczkowska D., Wspieranie postaw innowacyjnych przez wzmacnianie kreatywności jednostki. PARP Warszawa 2010, p. 47; Szopiński J., Kreatywność menedżerów a ich funkcjonowanie rodzinne, zawodowe i osobowościowe. Pub. Jagiellonian University . Kraków 2004, p. 28.



Into the most important factors stimulating student's creativity is encountered interpersonal relation between the student or group of students and the teacher. There appears a notion of "creative teaching" defined as a successful communication process between teachers and students, which is perceived by the students as novel and valuable in helping them to develop and to be ready to face new challenges (De Sousa 2007, p. 22). It is stressed that teacher's function should not be restrained to be a moderator who does not intervene into the creation process only, he should be first and foremost a leader, a group headman (Karwowski 2005, p. 53; Wojtczuk – Turek 2010, p. 133). The teacher should be a leader who is: democratic, non-directive, transforming, charismatic and emotional. During his course of action he should adept following rules (Jerzyk et.al. 2004, p. 27):

- regarding the students as subiective;
- encourage them to independence;
- dedicate to the students time beyond didactic classes;
- presenting them with high expecations and showing them ways of their realization;
- directly reward their action and achievements;
- to be enthusiastic and lead interesting classes;
- satisfactory interpersonal contact.

To the biggest barriers to be defeated during the creation process, after Dobrołowicz, are counted psychological and psycho-social ones (Dobrołowicz 2005, p. 26). Those barriers make the students use only insignificant part of their objective possibilities, both inner ones (intelligence, gained education, personal experiences) and outside ones, created by the milieu, including the higher school (various forms of knowledge and competences development in didactic process and beyond it, accessibility of school resources – substantial, financial, informative etc. ones).

Due to its importance, the problem of student's creativity becomes more and more an object of theories and scientific researches. In most studies of creativity in higher education aspects closely related to teaching-learning process are undertaken - creativity of teachers and students (Wojtczuk – Turek 2010; De Sousa 2007). However, there is lack of studies on how to organise the educational process, in order to encourage and stimulate students' creativity by appropriate organisational structures and activities. In this research project we focused on didactic (teaching-learning process) and non-didactic (beyond teaching-learning process) organisational forms and activities used by schools in order to stimulate students' creativity.

Methodology

The researches were conducted in 2012 in 4 higher schools in Poland. Following schools took part in the research:

- State schools: Jerzy Kukuczka Academy of Physical Education in Katowice and Witold Pilecki's The State School of Higher Education in Oświęcim,
- Private schools: The Bogdan Janski's Higher School – Faculty of Management in Warsaw and The Higher School of Management in Warsaw.

In the study the following research problem was formulated: Do schools effectively stimulate the creativity of students in the educational process? Presented hypothesis states that organisational forms and activities used by researched schools in order to stimulate students' creativity are insufficient and inadequate in relation to their expectations. There were following research questions formulated:

1. Which schools organisational forms and activities are used to stimulate students' creativity?
2. Which organisational forms and activities students are participating in?
3. In students opinion, does the school stimulate them?
4. What are the barriers and restrictions in stimulating students' creativity?

The researches consisted of two stages: during the first stage forms and kinds of activity undertaken by higher schools in order to activate the students and encourage their creativity were identified. Observation of higher education sector indicates that schools take various activities to activate and stimulate students'

creativity. Analysis of schools documents allowed to diagnose the didactic and non-didactic forms, methods and tools of stimulating students creativity. The most popular methods and tools of stimulating students creativity during teaching-learning process (didactic forms) are:

1. asking questions to students;
2. projects for independent preparation;
3. group's work;
4. brainstorming;
5. case study;
6. visualisation (maps, pictures, graphs, movies etc.);
7. analogy;
8. mind mapping;
9. others.

Schools also stimulate the students' creativity beyond teaching-learning process (non-didactic forms). The observation of schools performance allowed to indicate the most frequently used organisational forms of stimulating students creativity. There are:

1. student organisations;
2. scientific groups;
3. sport organisations;
4. participation in voluntary events;
5. participation in trainings and courses;
6. participation in seminars, conferences, meetings;
7. other activities.

In the second part of the research the questionnaire studies were performed among fulltime students of management faculty. The questions encompassed in the questionnaires were related to:

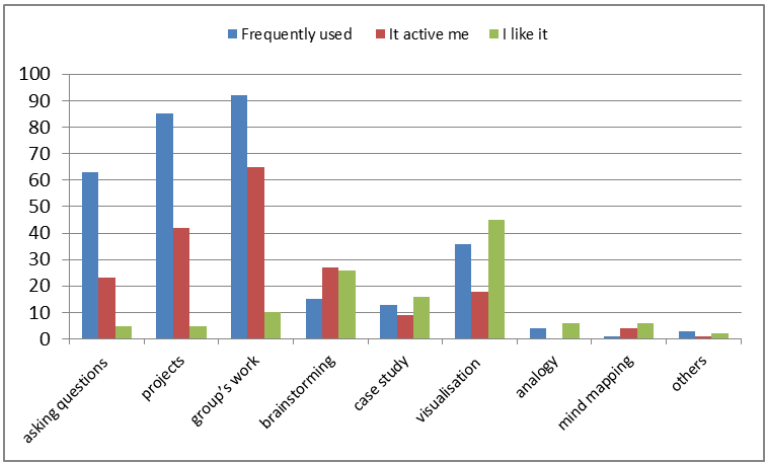
- forms, methods and tools of stimulating students' creativity in didactic process (teaching and learning process);
- non-didactic activities to stimulate students' creativity – organisational forms;
- barriers of students' creativity.

Obtained results of the researches are presented below.

Results

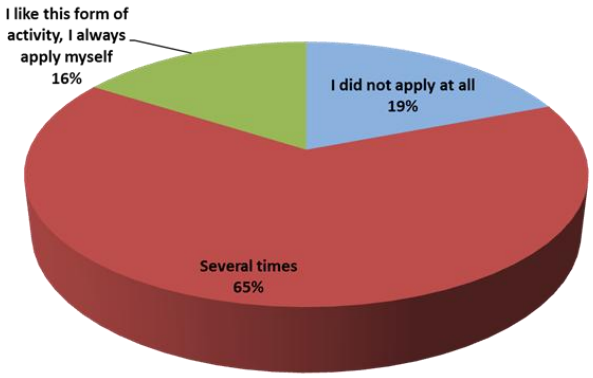
The research evaluated which of the methods of student's activation are the most frequently used by lecturers, which of methods activate students and which of them students like the most. The most popular methods used by teachers, which also activate students the most are: working in groups, individual projects and asking questions. At the same time, these methods are the least liked by the students. First of all the students like methods of visualisation, case study and brainstorming. Results of the research are presented on the chart 1.

Chart 1: Which of the methods of students' activation during their classes is the most frequently used by lecturers? Which of the methods makes you the most active during your classes; which do you like the most?



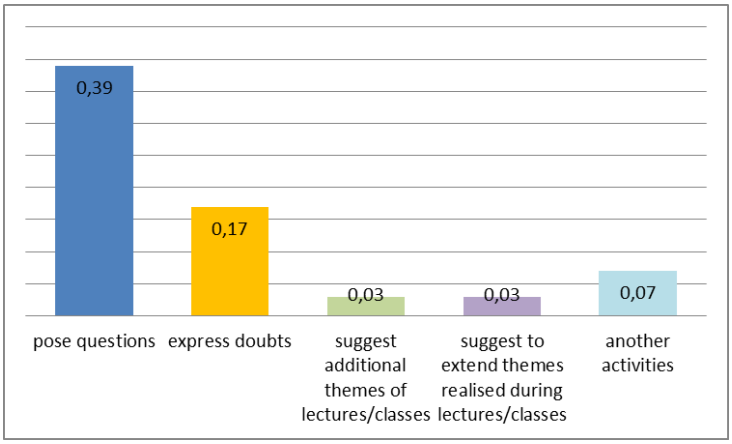
In the research the students were asked to determine the frequency of their entering into independent projects (chart 2). Almost 19% of researched students didn't apply for preparation, individual or group, independent task, work, 65% of students did it several times.

Chart 2: How many times did you apply yourself to prepare a paper, project, presentation e.a.?



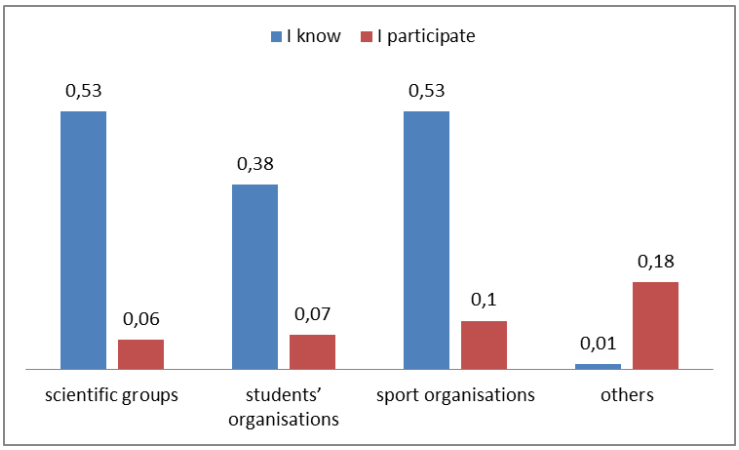
The most popular students' activities during classes is posing questions. Some of the students express doubts – 17%, students rather don't extend or suggest additional themes presented during the lectures and classes (chart 3).

Chart 3: Do you undertake any activities during your classes?



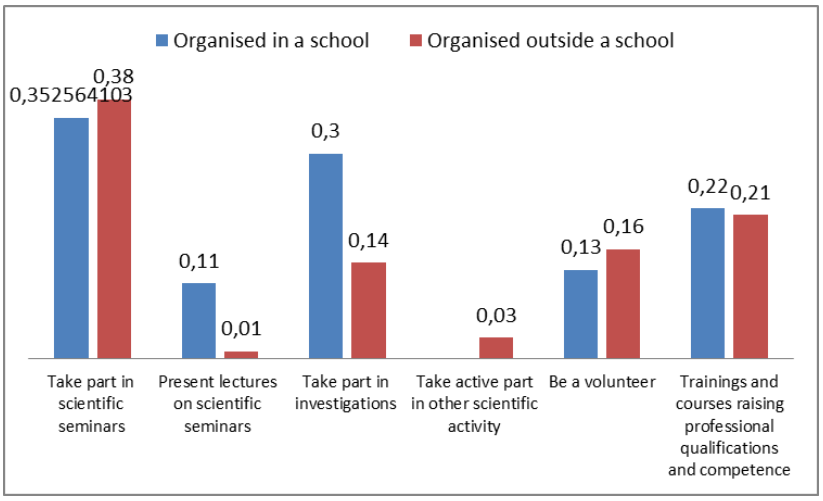
During the research students were asked whether they had known organisations operating in their schools and did they participate in chosen organisation during their studies. Chart 4 shows that students in majority knew organisations performance in their school but only a few percent of conducted students participated in these organisations.

Chart 4: Are you aware of organisations operating within your school? In which student organisations were you active during your studies?



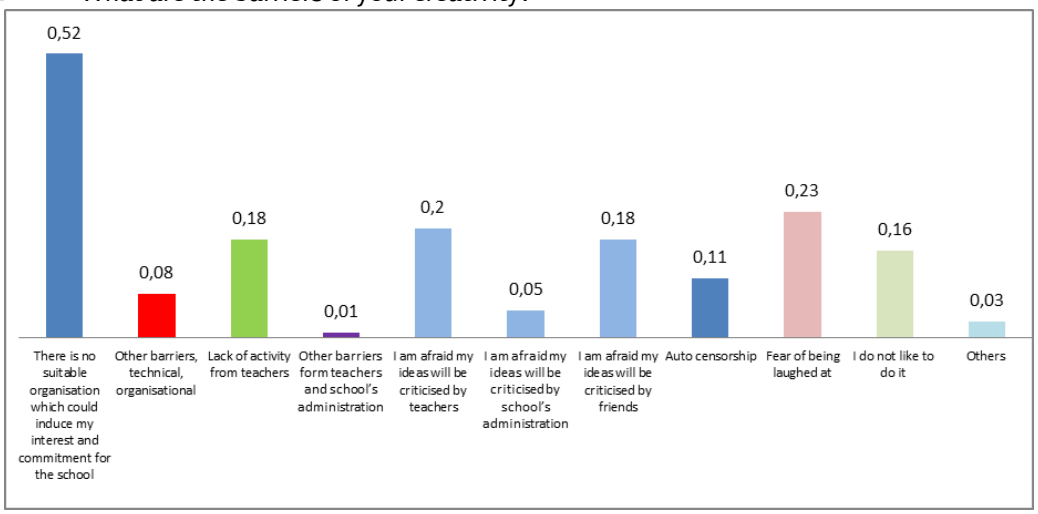
Students were also asked whether they participated in other forms of activities organised in their school and outside the school such as scientific activities, voluntary activities and trainings and courses raising professional qualifications and competence (chart 5). Over 35% of the students took part in different scientific seminars, nearly 30% participated in research projects. Students also improved their professional competences – over 20% took part in various forms of trainings and courses beyond formal teaching-learning process. Voluntary became more popular activity among students.

Chart 5: During your studies, did you take part in some form of scientific activities, volunteer activities and trainings, courses raising professional qualifications and competence?



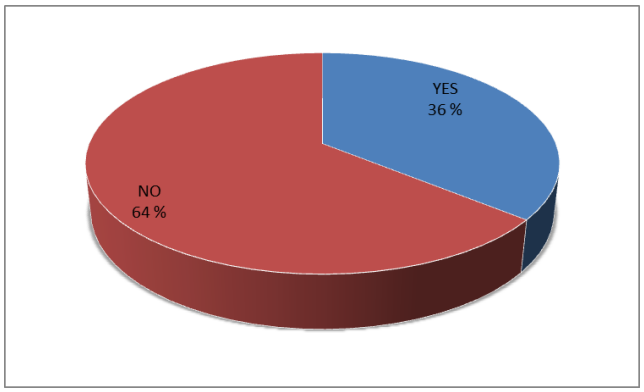
The results of the research show that the biggest barrier of students' creativity is incompatibility of school offer referring to organisation and form of encouragement students' creativity to their expectations. Almost equally important factors are: fear of criticism and making oneself ridicule, self-censorship, fear of bearing the costs connected with creativity. Students also indicated that the teachers don't encourage them to be creative (chart 6).

Chart 6: What are the barriers of your creativity?



In the research the students were asked to grade their own creativity.. 25% of students claimed that they are very creative, 62% of students claimed that they are a little creative, 13 % - not much creative. None of students, in their own opinion, said that they are not creative person at all. The students were also asked whether the school encourages them to being creative. 64% of researched students agreed the school does not encourage their creativity (chart 7).

Chart 7: Is the school waking your creativity up?



The final results of research showed that:

- Students think of themselves as creative people, but that does not result in their active participation in the didactic process and various forms and organisations realised apart from this process.
- The majority of students have estimated that the higher school stimulated their creativity mainly in the teaching process (by the means of projects, analyses, presentations performance etc.). However, one should bear in mind that the forms of students' creativity stimulation during the studies are in majority directly linked to getting positive note from a given subject. Student's creativity is often forced by the teacher, not spontaneous, sourcing from auto-creation. It is confirmed by further results, the students seldom do get involved into the didactic process through expressiong doubts, suggestions of more thorough work on their classes or new subjects.
- Schools take various activities to stimulate students' creativity, but test results indicate low interest in these forms of student activities during the studies. The students possess good knowledge of various forms of creativity stimulation proposed by the schools; however on can notice they prefer one-

time activities (participation in voluntary events, participation in training and courses, participation in seminars, conferences, meetings) to continuous, related with membership in an organisation (student organisations, scientific groups, sport organisations).

- The main barrier of students' creativity is incongruity between what schools offer to activate students and students' expectation. Organisational forms and activities used by schools in order to stimulate students' creativity are insufficient and inadequate in relation to students' expectations. As an important obstacle of their creativity the students point out the environment which does not support creative behaviors, especially teachers' attitude.
- 64% of researched students agreed that school doesn't wake up their creativity.

Obtained results allow confirming the hypothesis formulated in this research. Tested higher schools take various actions in order to stimulate students' creativity, but these are often insufficient and inadequate to their expectations. There are many barriers of student's creativity sourcing in majority from the environment not favouring student's creativity.

Conclusions

Nowadays graduates' creativity became part of the most expected learning outcomes in modern society and economy. The first one- employers expect graduates to demonstrate creativity in problem finding and solving, to have a well-developed ethical stance, to be able to contribute to their company's position on sustainability and sustainable development, and to display a high level of crosscultural understanding (Petocz P., Reid A., Taylor P. 2009, p. 409). The second one - many of the graduates start their own companies, the creativity will help to gain a competitive advantage on the market and be successful in the business, to create stable work places. The third one – society expect creative leaders who lead them to success in economic, social, cultural, technical and other spheres of human and social activity.

Obtained results of the researches state that developing creative competences of the students, including creativity, requires from the school taking a holistic approach to education and taking appropriate action in planning, realisation, valuation and improving the quality of education process. Stimulation of students' creativity should not be realised in the mainstream didactic process as the classroom lecture format is, by nature, not a natural laboratory for interaction, collaboration (Livingston 2010, p. 60), and creativity cannot be forced, commanded and controlled (Gil, Spiller 2007). Bigger possibilities of student's creativity stimulation are given by taking activities beyond the didactic process through creative solutions of tasks related to actual social, technic, utilitary, scientific etc. problems, allowing the student to experience reality in more real and exact conditions. However, the test results show small interest of the students in taking part in offered by the school organisations and action; the students point out that said offer is not right and does not meet their expectations. An important factor stimulating student's creative attitude development is school environment, but most of all the teacher's approach. There exist results of researches showing subjection between the methods of education used by the teacher and student's creativity (teaching the skills and attitudes of creativity, teaching the creative methods of the disciplines, developing a problem friendly classroom, using of prior knowledge, using different types of problems, using multidisciplinary, hands-on projects, using lesson plans) (Lemmy, Waugh 2010). Also the results of the studies indicated that faculty research orientation was indeed positively related to student participation in research and creative activities (Hu, Scheuch, Gayles 2009). In the research the students showed that one of main obstacles for activity during their studies is lack of encouragement from teachers and fear of being criticised by them. That points to an inappropriate relation between the teacher and the student - creativity, though, lies not in the teacher, nor in the student, but in the interaction between the two (De Sousa 2007).

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Measuring Creative Learning Activities – A Methodological Guide to the many Pitfalls.

Monique Boddington & Shima Barakat

Abstract

This session looks at the instrument that has been designed as part of a European-wide project to investigate the role of creative learning activities to enhance innovation. The focus here is on the methodology of designing and setting up such an instrument, specifically the problems and issues raised by such a task. The survey based instrument aims to identify specific conditions and factors that enable or inhibit creative learning. The web-based survey works through looking at individuals creative and innovative self-efficacy (ES) and the methodology is based on measuring changes in ES before (pre) and after (post) a learning activity or programme. Researchers have repeatedly demonstrated that ES is an excellent predictor of future activity and therefore a desirable measure in itself as well as an excellent proxy measure for skills. The survey is designed to be applicable to various different courses of very different natures across Europe. The design of the survey is based on theoretical findings from a number of previous studies. The instrument will be able to measure the impact of different courses across different factors making it possible to benchmark a wide variety of different learning activities. During the design of the instrument many different methodological issues were tackled. This session focuses on the many issues in using and designing such a measurement tool: ranging from issues in tackling the many different socio-cultural dimensions of this study to more practical issues, like the dissemination of the survey to target an adequate number of individuals. It is hoped that this session will show how it is possible to measure specific creative learning activities over a wide remit and open a dialogue for possible future research into understanding how creative learning activities can be used to enhance innovation.

Introduction

Creativity is viewed as central to entrepreneurship [(Timmons 1994) and entrepreneurial intentions (Hamidi et al 2008). Many entrepreneurial programmes now include learning activities designed to make the student think and act more creatively. As education in this area moves away from more traditional approaches it is no longer possible to measure courses by how well they teach students to write business plans or complete case study assignments or on student feedback, employability and financial returns. Creative learning activities aim to change the very behaviour of individuals as creativity is strongly associated with entrepreneurship and innovation (Amabile 1996). There is a need for a new type of measurement. With the growing number of creative learning activities now being taught there is a need to better understand what impact they are having and if they are filling the theoretical remit of making individuals more creative and by association innovative and entrepreneurial.

As part of the European wide, EU funded project called Creative Activities in Learning for Innovation (CAL4INO), the Centre for Entrepreneurial Learning at the University of Cambridge was (and continues to be) responsible for designing and developing tools that would be capable of studying and measuring creative learning activities that aim to enhance innovation. These tools needed to be robust enough to generate indicators for benchmarking different creative learning activities and sensitive to socio-cultural contexts.

This paper focuses on the survey instrument and on the many issues that we came across whilst trying to set up this instrument. There is an increasing amount of literature on measuring learning activities and measuring creativity but the focus of these is frequently on the results with broad statements on research methodology where numbers are presented as the product of different statistical techniques and only broad statements are made regarding research methodology. In taking up the exercise of designing tools, to measure creative learning activities, we found that the research of this nature is not straightforward. We came across many different issues: from the theoretical (e.g., defining creativity), to the practical (e.g., issues of data collection). The aim of this paper is to open up debate within this area and to open a dialogue on possible future research into understanding how to measure creative learning activities and by association how to use this research to enhance teaching in this area. The first section of this paper will focus on defining creativity and innovation through surveying the current literature in this area. It is important to understand these concepts to be able to know what is being measured to understand how to measure creativity and innovation. There have been multiple tests historically for creativity; however as will be shown traditional methods of testing have certain limitations making them unsuitable for the current project. We therefore look at the concept of self-efficacy. Within which it is possible to look at both creative and innovative self-efficacy and therefore use the concept to build a tool capable of understanding the impact of creative learning activities focussing on innovation.

The second half of this paper looks at the more practical aspects of using a survey based instrument and our personal experiences in rolling out the survey instruments. We begin by discussing one of the biggest issues with any tool of this type – survey attrition. Any project of this type is only as good as the data collected; therefore we consider issues concerning gathering data and biases in data. A further element to this is choice of survey dissemination which can impact attrition and bias the data. We then move on to consider theoretical issues with using a tool of this kind, largely undocumented. Looking at the survey we questioned 'What are we measuring' which is crucial with any tool of this kind. This made it clear that certain checks have to be put into a project of this kind to ensure that what is being measured is actually what you want to be measured.

Defining Creativity and Innovation

The first issue in measuring creative learning activities is the question of 'what is being measured?': 'how do we define creative?'. Kaufmann (2003) notes that a lot of research has focused on a "'bottom-up' perspective, where development of tests of creativity have taken

priority over the clarification of basic conceptual and theoretical issues."(Kaufmann 2003, 236) Without defining basic conceptual and theoretical constructs there is a real danger of undermining any instrument.

There are numerous models for creativity and a definition has been a matter of debate for decades, this is a complex issue and one that is not detailed here (for more detailed discussion refer to Berg, 2011). For the purposes of designing a measurement tool the project team began by debating and researching the concept of creativity. While any definition of creativity is fraught with controversy, creativity can be defined as: "The development of a novel product, idea, or problem solution that is of value to the individual and/or larger social groups" (Hennessey and Amabile 2010). General consensus in the field supports this definition (See also, Tierney, Farmer et al. 1999; George and Zhou 2001; Sternberg, Kaufman et al. 2002; Fisher and Amabile 2009).

Research has also indicated that creativity has a heuristic character within which, not only is the outcome novel, so too is the process within which it is created (George and Zhou 2001, 514). Within team creativity it is argued that creativity involves interaction between individuals and environment (Sternberg, Kaufman et al. 2002). Further, given the rise of technology and specialization, creativity has become more a product of organizational effort than lone geniuses (Fisher and Amabile 2009).

Creativity within the entrepreneurial process is therefore defined as:

"the ability to develop novel products, ideas, or problem solutions which are of value to the entrepreneurial individual and/or team in their pursuit of an entrepreneurial opportunity and that take place in a heuristic environment" (Berg, 2011, CAL4INO theoretical framework).

The aim of the instrument is to measure learning activities that aim to increase the innovation potential of students/participants and enable a comparison between the impact of traditional and more creative learning and teaching methods. The instrument had to be framed in terms of innovation and we included measures for creativity and entrepreneurship as these are so closely related to innovation. Relating creativity to innovation it is possible to draw out certain themes (see Berg, 2011 for full discussion):

Table 1: Themes around innovation and learning activities

Impact on:	Current skill and abilities
	Confidence in performing specific tasks
	Taking risks and view of risk
	Future career decisions
	Creative skills
	Confidence in performing creative practical tasks
	Working within a team

The survey instrument was therefore designed with these general themes in mind. As mentioned above, the instrument needed to be robust enough to measure these different themes and also sensitive enough to allow for contextual diversity.

How do we measure creativity and innovation?

We therefore move on, from considering what is being measured to how to do it? How do we measure creativity and innovation if that is our outcome objective? Many different methods have been used to measure creativity, less so innovation, and we had to decide on the one that fitted best with the needs and resources of the project.

The most common method of measurement is psychometric testing (Plucker and Runco 1998; Plucker and Makel 2010). It is suggested that the predominance of psychometric testing is due to researchers extending their research from other areas, for example aptitude and ability scores, and extending the methodology to measure creativity (Plucker and Makel 2010, 49). Historically the most popular form of testing has been divergent thinking (DT) tests, for example the Torrance Test of Creative Thinking (Torrance 1974) and Wallach and Kogan (1965)Test. While DT tests do vary, they generally 'ask for multiple responses to either figural or verbal prompts, and responses are scored for fluency, flexibility, originality, and elaboration of ideas." (Plucker and Makel 2010, 52) However, these tests are undermined by their lack of predictive validity (Baer 1993; Gardner 1993; Wiesberg 1993). Nonetheless a number of studies have demonstrated the discriminate and predictive validity of DT tests though the response is mixed (Plucker and Makel 2010, 54). Further developments in recent years in this area have emphasised the importance of implicit theories towards social validation of creativity tests (Plucker and Runco 1998).

Within an innovation/entrepreneurial setting there are a number of studies that use a range of techniques to test creativity Taggar (2002), studying individual and group creativity within an organizational background, tested creativity through the use of case study questions (relevant to the background of individuals) analysed by observational scale measures and written work scoring. Forms of psychometric testing continue to be popular (Hirst, Van Knippenberg et al. 2002; Liao, Liu et al. 2002; Pirola-Merlo and Mann 2004).

While the tool had to be both robust and able to create meaningful indicators, one of the biggest deciding factors was that it had to be easy to implement and use across multiple programmes and multiple countries. It was therefore felt that most methods of psychometric testing, specifically DT tests, required too much in terms of man hours and other resources to be practical. Alternative measurement tools that score individual creativity through observation and written tests were again too resource heavy and arguably, results from different studies would be incommensurable (with different people producing different ratings).

Innovation has been generally measured in a more traditional manner, for example return of investment. To analyze innovation there have been three broad areas of indicators: the use of R & D data, data from patent applications and scientific publication and citation (Smith 2005). However looking at creativity towards innovation we wanted to move away from such markers and look at how to measure the change in the individual becoming more innovative. We therefore turned to a form of psychometric test different to those detailed above.

Self-Efficacy

The survey instrument is rooted in the concept of self-efficacy which is best understood as a person's confidence in their own ability to perform a specific task (Bandura, 1977). It is argued that self-efficacy provides a legitimate and robust construct that can be used to evaluate entrepreneurial education (Barakat et al. 2010; Chen et al. 1998). Self-efficacy influences the motivation and ability to engage in specific activities (Bandura 1977) and is a strong, necessary condition of creative productivity and in discovering new knowledge (Bandura 1997). It has been argued, that the concept of self-efficacy can be used as a promising tool to understand creativity (Tierney and Farmer 2002). This has been practically tested (Tierney and Farmer 2002; Farmer, Tierney et al. 2003) by focusing on the practical implications of Ford's (1996) theory that self-efficacy influences employees' creativity. Ford presented a theory of individual creative action within organizational settings. Creativity and innovation are seen as closely interlinked and creativity plays different roles across different layers of the innovation process. Creativity is facilitated and constrained by a number of mechanisms including: sensemaking, motivation, knowledge, ability and capability beliefs or as referred here self-efficacy. The findings of the study supported Ford's theory that self-efficacy influences employees creative decision making in their work and compared to other factors was the only one to have alone a 'main effect'. (Tierney and Farmer 2002). This research practically demonstrates that self-efficacy is an effective marker of creativity.

Within the context of entrepreneurial education, entrepreneurial self-effiacy is strongly correlated to new venture creation (Zhao et al 2005). Entrepreneurial self-efficacy is linked to certain behaviours, for example opportunity recognition and innovation associated with entrepreneurship (Chen, Green et al. 1998). Lucas and Cooper (2005) have argued that self-efficacy, more than any other psychological construct, is linked to commitment to accomplish goals. Determination is an essential for would-be entrepreneurs who often take many risks and spend many years in the face of adversity.

Self-efficacy has been researched extensively within social science disciplines but only more recently within management and entrepreneurial research. As a method of measurement it has been employed in only a few studies. Given the clear links between self-efficacy and entrepreneurship, and in particular creative self-efficacy and entrepreneurial education, it is clearly a powerful concept that can be used to better understand creative learning activities for innovation in entrepreneurial education and enhance teaching within this area. Further, given the nature of survey instruments, participants are asked about their perceptions and with self-efficacy being one's own confidence in one's own ability it is therefore an ideal construct for a survey based instrument that collects self-reported data.

Rolling out the survey instrument

Once we had chosen a particular method of measuring the impact of a learning activity, months were spent on the design and testing of the instrument, however in this paper rather than go into great detail about the design and nature of the instrument, as stated earlier, the aim here is to discuss some of the more ordinary and not so ordinary issues we experienced in designing and rolling out the instrument.

The survey was to be completed by individuals participating in a selected course at three different points in time: immediately before the start of the course, immediately after the course is completed and 6 months later. The rational was simple, it would then be possible to compare results before and after to gauge the impact of different courses in the short term and from the delayed post-test data would be collected about the longer term, sustainable effects. This would make it possible able to compare and benchmark different types of courses across Europe, in line with the original aims of CAL4INO. The target numbers embodied the broad geographical remit of the project and arguably, the ambitiousness of the project. The aim was to target 3000 individuals across approximately 150 different programmes.

The first and perhaps the largest issue with the use of any survey based study is data collection. It is interesting that despite the number of papers out there that include some type of quantitative study very few will discuss the issues of the realities of amassing enough data. It is common practice to quote the number of individuals measured but not how many man hours it took nor how many individuals failed to complete the survey (in rare cases percentage uptake is stated) which can have statistical ramifications. Instead, issues are consolidated within a simple response rate figure.

Surveys can provide a rich dataset and provide a snapshot of large populations, unlike qualitative approaches which target smaller numbers for more in-depth research. Any study that relies on the survey collection is only as a robust as the data collected, a problem that we experienced firsthand. Harte and Stewart (2010) discuss the main issues they had with survey attrition on a project not too dissimilar to our own, in the end they abandoned the quantitative portion of their project as a consequence of poor survey uptake.

Survey Attrition

One of the biggest issues with any survey based study is survey attrition and non-response. Many factors can impact attrition, for example: language and length of survey; method of dissemination; incentives. Low response rates undermine statistical analysis by increasing the size of confidence intervals therefore limiting the types of statistical techniques available to the researcher (Rogelberg and Stanton 2007, 195). Low response also undermines the perceived credibility of any project (Luong and Rogelberg 1998). Nonresponse can cause bias in the data, as certain individuals complete the survey and

others do not this (Rogelberg and Stanton 2007, 196).

It is widely recognized that survey uptake has dropped in recent years (de Leeuw and de Heer 2002; Rogelberg and Stanton 2007; Thompson and Surface 2007). The increasing popularity of web based survey tools, like Survey Monkey and Qualtrics, have made it easier than ever to set up and disseminate surveys. WEBSM, a nonprofit website on issues surrounding web surveys lists 366 different online survey software packages (see www.websm.org). However, it has been argued that this has led to over surveying which in turn decreases individuals inclination to complete surveys (Thompson and Surface 2007).

In setting up our survey we quickly realised the implications of the task of collecting thousands of responses across multiple countries and programmes. The first issue and one that was fully expected were issues of non-response. Generally as we had no direct access to students on courses in other institutions, we would forward survey links to course supervisors/convenors. This led to mixed success, ranging from very high attrition to the link not even being sent out. Often when we had high attrition rates for the pre survey we would have very low response rates for the post survey. With the courses where we had no direct access to students we had very little control in how the survey was disseminated. For courses where we could contact students directly it was found that multiple reminders were needed to get higher response rates. Contacting individuals three or four times made it possible to reach 75-80% response rates. The biggest problem reported about the survey remained its length, something we could do little about due to the nature of the survey and yet taking 15-20 minutes is note excessively long for this type of survey. By far the most successful method of raising response rates and lowering attrition was to make the survey compulsory as part of the course, this led to pre-survey reponses in excess of 80% but post-survey and 6 months post still saw a dramatic drop, as seen in other longitudinal studies (Thompson and Surface 2007). Whether the survey is voluntary or compulsory has potential implications for the results and this factor must be taken into consideration for example if the data is to be regarded as self-selected or not.

The most unexpected issue that we came across was one of access. While certain individuals running programmes were very keen for us to measure their programmes others were not. Some individuals happily passed on pre-survey links to individuals but then would not pass on post links. While we do not have sufficient evidence to comment on the reasons for this, it is possible to surmise why this is from the conversations we have had with programme convenors/supervisors. Educators develop attachments to programmes they have nurtured over time. This tool provides us with the ability to evaluate the impact of their programmes and compare them to other courses in a shorter time period and in a manner which is out of their hands. In addition to possible issues of trust and vulnerability at having an external group evaluate a course that has been developed over time and effort, there appeared to be a more personal issue at play. Course leaders may collect student feedback but this is often general and in the vain of a satisfaction survey whereas impact scores create something that appears more definite and objective, measuring impact (intended or not) and there may be a fear of what could be discovered from the use of the survey instrument.

Web versus paper based surveys

The survey instrument was disseminated via the web based packages Qualtrics. Using online software saves on time (no data inputting post collection) and makes it easier to disseminate across a wider geographical area. In recent years there has been a general shift towards web based surveys (Thompson, Surface et al. 2003) but on occasions where it was not possible to use the software paper copies of the survey were offered as an alternative. In general response rates were higher for programmes where paper copies were used, however it remains unpractical to do this for only but a handful of programmes. Generally web-based surveys have lower response rates than paper surveys (Couper 2000; Manfreda et al 2005) and offering both paper and online options produces the highest response rate against either method singularly (Sax, Gilmartin et al. 2003). Several explanations are given for lower responses in web based surveys including: lack of a continuous reminder, perceived as less legitimate; impersonal and easier to decline (Manfreda et al 2005). We have found that high

responses can still be gained using web based surveys as long as individuals are reminded on a number of occasions and in some cases the surveys are made a compulsory part of the course.

The choice of method can lead to nonresponse bias, for example certain types of individuals are more likely to complete paper based surveys over web based surveys and vice versa, for example men are more likely to respond to web based surveys than women (Kehoe and Pitkow 1996; Palmquist and Stueve 1996; Sax et al 2003; Smith and Leigh 1997). Access is also an issue with web-based surveys biasing certain groups that have the ability and knowledge to complete online surveys (de Leuuw 2005; Dillman 2007; Manfreda et al 2008).

Mixed mode approaches (using different types of survey) are increasingly popular (Couper 2011) and make it possible to compensate for individual method weakness at affordable cost, for example coverage: higher response rates are achieved by using the less costly method first (de Leeuw, 2005). However while mixed methods are used to reduce issues of nonresponse they can lead to measurement error (Couper, 2011). Mode effects between paper and web based surveys are difficult to correct for (de Leeuw, 2005). The difference between web based surveys and paper based surveys may also lead to response bias, the way in which the questions themselves are answered (Couper, 2000; Dillman, 2007; Meade et al., 2007). The circumstances under which an individual completes a survey will have an impact on the way they answer questions. For example web-based surveys will be completed, generally, at a time to suit the individual whereas a paper-based survey may be handed out at the beginning of a course in a classroom situation and therefore solicit different answers. Arguably it is difficult to control bias of this kind unless all surveys were taken at the same point at the same time, which is often not possible and even then it is impossible to control the mood of an individual on the day. Unimode construction is one solution given for mode difference: "the writing and presenting of questions to respondents in a way that assures receipt by respondents of a common mental stimulus, regardless of survey mode" (Dillman, 2007; 232).

Data Collection and Outside Influences

As stated earlier, to gauge the impact of different creative learning activities results are collected before a learning activity, post the completion of the activity and 6 months after. For a given course the data collected at different points in time can be compared and used to gauge the impact of a specific learning activity. The problem is what is actually being measured is everything that has happened between the two/three points of time that the data is collected. This includes the learning activity but it also includes everything else that has happened to this person in between the two/three points in time. This is a problem for any research of this kind, for any instrument of this type and any of the tests of creativity discussed previously. For example if a person has a bike accident in-between taking the survey this could greatly impact their relationship to risk (measured by the survey instrument). It is impossible to tell from the results whether a change is because of the bike accident or because of the learning activity.

The survey instrument is designed to measure the impact of different learning activities by measuring individual's self-efficacy, however not all individuals are impacted by learning activities in the same way and these changes can be relative to social and cultural identity. For example if one course is shown to have had a major impact on creative self-efficacy but those people on the course have a specific make up of identities, how is it possible to know whether the change in self-efficacy are due to the course or are a product of the specific identities of the participants.

It was crucial at the project design stage that the two issues detailed above were considered, that the design of the instrument took into account these issues otherwise it would not be possible to know what we were measuring. There was little literature that dealt with these issues and it was found that this was an undertheorised area. Several different strategies were employed to overcome these methodological issues.

To better understand the impact of different social, cultural and individual identities on the

data the aim was to measure the same programme/learning activity in different location. These 'pilot demonstrations' aimed firstly, to understand how different identities are impacted differently by a specific learning intervention and secondly to see if the instrument is sensitive enough to measure for such differences and if so how do these differences bias the data. This would make it possible to gauge the impact of socio-cultural effects on the data and allow for this in any analysis of different creative learning activities. The main issue with such an approach is that it requires a lot of time and a lot of resources to run, for example, the same two day course in six countries with the same lecturers, supervisors etc. Even then, it is questionable how possible it is to run a course where everything is identical except for the participants. The alternative strategy was therefore to test for biases in the final analysis of data if it became not possible to run the same programme in multiple locations.

To overcome the methodological issues of knowing what was being measured a mixed methodology (quantitative and qualitative research combined) was employed. Social research during the first half of the 20th century was dominated by quantitative methods within a positivist paradigm. Qualitative methods rose to prominence during the 1970's and 1980s as part of the constructivist and post-modern approaches. In more recent decades a mixed approach, making use of both quantitative and qualitative methods, have arisen out of a need for triangulation of information from different sources (Teddlie and Tashakkori 2003).

A mixed method approach makes it possible to answer different types of questions. Generally quantitative research is confirmatory whereas qualitative research is exploratory though this is not necessarily the case (Punch 1998, 16-7). Mixed methods also offer the advantage of overcoming the inherent disadvantages in one methodology for example, using a method with greater depth and one with greater breadth (Teddlie and Tashakkori 2003, 16 -7). Arguably, the most important function of mixed methods is triangulation. The use of mixed methods allow for multiple inferences that can confirm or complement each other. The use of a mixed method makes it possible to answer a broad set of question and through the use of multiple lines of evidence strengthens inferences made and conclusions reached.

The major disadvantage to a mixed method approach is the relationship between particular methods and different paradigms. One way to overcome this is to follow a paradigmatic stance where it is held that methods in the real world can be separated from the paradigm they emerged from (Patton, 1990). The incompatibility thesis, popular during the paradigm wars of the 1980's and early 1990's, declares that any research based on methods from different paradigms would fail due to the incompatibility of epistemological stances (Guba, 1987; Smith and Heshusius, 1986). However this has largely been discredited by the number of successful studies making use of a mixed methodology (Teddlie and Tashakkori, 2003,). There are several different methods for overcoming paradigm issues, for example: single paradigm thesis (a single epistemological stance that can support different paradigms); the dialectical thesis (each paradigm has something to offer) and the multiple paradigm thesis (Ibid). Clearly the design of a mixed method approach has to account for the paradigms of the instruments being used and allow for any epistemological issues, contradictions and the general impact of the methods individually and jointly. The main researchers need to be able to distinguish the relationship between inferences from the data and the paradigm they have been created within, so as to understand the relationship between different inferences produced by different methods frequently based on different paradigms.

Through the use of a mixed method and pilot demonstrations it is hoped that it will be possible to ensure that the findings from the instrument will be measuring the correct thing and not just socio-cultural variability, individual variability and other outside influences. Any survey based instrument will suffer from these issues and only through thorough project planning and apriori considerations of the possible issues is it possible to build a tool that is robust and able to measure learning activities across such a wide remit.

Concluding remarks

Designing a survey instrument that would be capable of measuring creative learning activities

(targeted at innovation) across a wide geographical area with the ability to generate benchmarks was always going to be a task that possessed inherent methodological pitfalls. The four main lessons we learnt were as follows: Firstly that any project of this type needs stringent planning and considering all ramifications by a project team that has prior experience in this area. Secondly, for any type of research like this a support network is crucial, you need access to programmes and you can't just presume you will gain this access. Thirdly, multiple lines of enquiry are needed to allow for method triangulation to makes sure that the data you are collecting is measuring what you intend it to. Finally, accept that things may change, the flexibility to change and compromise if something doesn't work, for example we never intended to use paper surveys but soon realized that in some cases it was the only possible way to collect data.

This paper also highlights an area of future research that is currently undertheorised. Often research of this kind has to take into account biases and the impact of socio-economic factors and individual identity but measuring different points in time other outside influences in individual's lives may impact the data, it is posited in this paper that this can be counterbalanced by the use of method triangulation however this area clearly requires more research into understanding what is being measured and to understand the impact outside influences may have on the data collected by survey based instruments.

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Creativity as seen through the complex systems perspective

Petro Poutanen

Abstract

In this paper, I set about exploring the possibilities of complexity theory and a complex systems perspective in providing new insights for creativity research. Although there is a rich understanding of the nature of creativity, more integrative frameworks for studying and supporting creativity in varying contexts are needed. Systems models responded to that challenge in the late 1980s, yet the links between the now well-known models and more recent developments in the systems sciences, such as in the area of complexity theory, are not well established. In this paper, I aim to clarify these links, and I will argue that a complexity perspective provides a useful framework for reframing many of the well-known "facts" about creativity. In addition, I will discuss more generally the possibilities, reasons, and limitations of a systems approach for studying creativity in contextual settings across different disciplines.

Keywords

Creativity, complexity theory, systems approach

Introduction

The understanding of creativity is proportional to the models and concepts we have of it. The approach to creativity influences the ways it is engaged, encouraged, fostered, studied, reported, evaluated, and so forth. Although creativity has been a topic of academic research since at least the 1950s, there is neither a universal definition nor a comprehensive understanding of creativity and its determinants and barriers. The plurality of the field is inspiring but sometimes suffocating. One possibility for overcoming the excessive amount of theories, perspectives, and concepts related to creativity and prevent fragmentation is to define the general determinants. It is, however, perhaps not possible to find such factors independent of the context. Therefore, a systems approach provides us with an additional perspective on understanding, studying, and modeling creativity.

In this paper, I will explore the possibilities of systems theories in general and focus especially on the so-called "complexity theory". Systems theories provide a general framework to understand phenomena, and complexity theory may additionally shed light on some general mechanisms across different kinds of systems. For example, there are certain systems theoretical traditions of modeling and understanding the research object, such as the whole-parts dichotomy. However, recent developments within the systems sciences, especially in the field of complexity theory, have brought along a great promise that one day the study of complex systems would reveal a group of unifying features concerning all kinds of complex systems (see e.g., Miguel et al., 2012). These features are not yet well established, but in any case, they provide many inspiring possibilities for explaining creativity from a systemic perspective.

The goals of this paper are 1) to explain why a systems approach provides a fruitful starting point for creativity research, 2) to present the most basic systems approaches to creativity and discuss critically what it means to conduct a study from a systems perspective, and 3) to compile the most inspiring and important development of the systems theories at the interface of creativity research and complexity theory.

The structure of the paper follows the ordering of the goals presented above. The purpose of the first section is to set the context of this paper and ground the argument for a systems perspective properly. The second section is barely anything other than illustrative in the sense that I will not focus on the traditional systems models of creativity per se (nor I will advocate any particular model); they serve here as examples of what one can do with a systems perspective. The third section is the most important from the viewpoint of this paper. It introduces the basic ideas of complexity theory and brings together the most interesting studies related to complexity and chaos and creativity. The thread of these studies is summarized in the end

Why a systems approach is needed?

Defining creativity is easy: It is a creation of something novel (and possible useful or "applicable") in its context. However, there are two nasty questions that must be asked when delving deeper into the concept. The first is whether creativity is general or specific, i.e., whether the characteristics of creativity correspond across different domains of inquiry. More generally, is it possible to explain the phenomena X in the context A with the same explaining factors E as in the context B? The second question concerns the limitations of individual-based explanations: Is the only way to construct explanations of creativity through individuals' internal states? Do we need to take into account social determinants, such as social class, gender, ethnicity, or other structural factors? Is creativity essentially the same in the context of the individual, the group, and the organization? In the field of creativity research these questions are often referred to as dichotomies between domain-specificity vs. domain-generality (e.g., Baer, 2010) and individual vs. social/systemic conceptualizations of creativity (e.g., Csikszentmihalyi, 1988, 1999; Weisberg, 2006).

The first question concerns the problem of whether skills, traits, characteristics, motivations, knowledge, etc. influence similarly the ability to be creative across all domains or whether each domain has its own particular ways to be creative. The best guess for the domain-specific vs. domain-general problem is that some factors are more general and others more specific (Baer, 2010, p. 321). For example, some individual traits or propensities underlying creative performance, such as being open to new experiences, connecting distant areas of expertise, posing challenging and critical questions, etc. may be quite general in their nature. On the other hand, different areas of expertise may call for different prerequisites for being creative; for example, engineers may need different skills and knowledge, and perhaps even traits, to be creative in their fields than, say, artists.

I will argue that domain generality vs. specificity is best solved by adopting a systems approach that operates at the level of generality necessary to address the contextual variation of creativity. Some of the determinants of creativity may indeed be quite general, such as "posing challenging and critical questions," but still domain-specific in a sense that one needs to hold certain type knowledge for recognizing the relevant problems and their possible solutions. Moreover, many things change, and also the factors affecting the creative performance may change over time. There is no need to hang onto any "facts" too tightly.

The second question concerns the problematic dichotomy between individual- and social-oriented definitions of creativity. This question has taken several forms in past debates. Firstly, the psychological study of creativity has dominantly focused on individual determinants to creativity, such as personal traits, cognitive skills, or giftedness and constructed individually based models of the creative process. However, when acknowledged that even individual creators are part of larger social structures and networks, these theories and findings have been set in a new light (see e.g., Sawyer, 2006).

Secondly, once the value of creativity for innovations is acknowledged, the question of the social value of creativity becomes more pressing. No studies on "organizational creativity" can be conducted satisfactorily if the social value of creativity is totally ignored; focusing solely on one aspect of creativity is not enough in an organizational context (cf., Montuori, 2011, p. 416–17).

The advocates of systems theories have declaimed that creativity is the sum of many (possibly interacting) parts of a system, including cultural and social aspects (Csikszentmihalyi, 1988, 1999). Others have remained close to a more individualistic perspective and refused to include social aspects in the definition of creativity (Weisberg, 2006). Weisberg points out that using value as a part of the definition of creativity makes the concept arbitrary in the sense that a person can first be creative and then become less creative when the social value changes—the danger of extreme relativism (in the end, over time anything can be creative) (p. 63–65). Therefore, Weisberg is reluctant to include the idea of social value of the product to the concept of creativity and wants to restrict the use of the term in individual production, whether or not socially valued.

One solution to Weisberg's critique has been to split the concept into two parts, namely into creativity with capital "C" and creativity with lower-case "c." Creativity with lower-case c (also "psychological" and "personal") refers to something that is novel to the creator him- or herself, but not necessarily to anyone else. In contrast, capital C creativity represents a historical or transformative idea that hardly anyone could have thought beforehand and that has a potential to change the whole domain (Boden, 2004). The latter term also comes close to the concept of innovation, which is generally understood as a creative idea implemented for the benefit of a larger community.

By distinguishing two types of creativity, the problem is solved in a way that, however, fragments the field. Now, those favoring individual-oriented creativity tend to fix on individual-based explanations, and those favoring a systems approach revolve around quite abstract systemic models. However, a systems approach is not about studying social or individual creativity, but it aims at converging different levels of explanations into one systemic whole in order to scientifically explain creativity and possibly predict its emergence. There are no "many creativities" but different perspectives on the very same phenomena, which may be captured effectively by a systems approach. For example, there is no C-creativity without c-creativity, and perhaps it is not the individual who makes the genius but the community advocating a certain type of giftedness or maybe a chance occurrence of history that dresses someone with the mantle of creativity. Similarly, scaling down to individual ideas or fragments of ideas, it is not the one idea that makes creativity, but the process of generating many relevant ideas and integrating them into a coherent entity that solves the problem. This may be as well an individual or a collective endeavor.

I advocate here that a systems approach aims at overcoming these either-or distinctions and oversimplified dichotomies, such as individual vs. environment. Before further detailing of a systems approach to creativity, I will briefly discuss the historical origins and development of systems science in order to construct a more coherent picture of what I mean by "a systems approach."

What is a systems approach?

To be honest, there is no one systems approach, but a group of different systemic approaches and perspectives, each having different historical and theoretical underpinnings. A more descriptive term may be "systems theorizing." Systems theorizing has long historical roots going back to the ancient Greeks and Aristotle (384–322 BC). Aristotle pondered the problematic relationship between the whole and the consisting parts. In the social and organizational sciences, systems theory had its heyday from the 1930s to the 1960s, but in recent years the approach has begun to reappear, especially in the form of the complex systems sciences and other disciplines studying nonlinear dynamics (Pickel, 2011). Besides being a tool for scientifically modeling various types of phenomena, it can also serve as an effective cognitive model for fostering individuals' conceptual understanding of given subjects at the conceptual and systemic level (Hung, 2008).

In general, the system can be any kind of entity consisting of parts, the mutual relations of the parts, and the relations between the parts and the whole. The system can be open, i.e., it has an environment in which it resides and with which it exchanges energy or some other substance. It may be closed, in which case its dynamics are governed mainly by its internal operations. In general, machines are closed systems, and natural systems are always part of their environments in some respect, i.e., they are open. Also, humans are parts of institutions, organizations, and societies, which, in turn, are part of larger economic and social entities. On the other hand, systems may have ill-defined boundaries, in which case an observer is not in a clear position to state where the system starts and where it ends. For example, one may ask, where are the boundaries of the human mind? Thinking is not possible without the brain, but is it possible without the surrounding environment? What are the sufficient conditions for thinking?

Finally, the system has some key processes (or mechanisms) that make it work (Pickel, 2011). These processes may not follow linear causal laws, but they can be non-linear and cyclic, arising from the interconnected nature of the system's parts with multiple feedback loops (Montuori, 2011, p. 415). For example, the economic system is governed with multiple feedback loops and interrelated actors making its dynamics non-linear and difficult to predict (Arthur, 1994; see also Cilliers, 1998, p. 6–7).

The basic argument behind a systems approach is holism. Holism means that the phenomenon under study cannot be attributed to any single cause or entity but is a result of many interacting components, i.e., the phenomenon is systemic by its very nature. The opposite, individualistic, stance would posit that the phenomena can be reduced to its component parts and explained exhaustively from there. However, as commonly misunderstood, a systems approach is not equal to a vague kind of "holism." Instead, "it invites us to analyze wholes into their constituents, and consequently it rejects the intuitionist epistemology inherent in holism" (Bunge, 2004, p. 191). Parts are seen as producing—through their interactions—the whole, and this process is subject to the system's architecture and environment (Pickel, 2011, p. 247). Thus, a systems approach not only utilizes analytic thinking (breaking wholes into parts to analyze them), it also uses synthetic thinking, that is, assembling the parts and studying what kind of entity they form together.

The second important aspect related to systems theorizing is the systems' dynamics. From the dynamic perspective, a system's structure and agency are considered within the framework of their mutual (co)evolution. Therefore, if a systemic approach is adopted, creativity needs to be seen in this context, as a systemic phenomenon, emerging from the interaction of several elements in a dynamical manner. The parts and relations influencing creativity may not only be different from one domain to another, they may also change over time and under different conditions.

A word about epistemology (and perhaps ontology) is also needed. Although in this paper I adhere to the "realistic" position according to which the interest is real-world actors, structures, and determinants of creativity, more meaning-oriented (or constructionist) perspectives are not excluded, should the "systems of meanings" with relation to creativity be of interest. One may, for example, ask, "How one's conception of creativity influences his/her experiences of his/her own creative performance?" and construct a map of related meanings that make up the individual conception. This may be further connected with organizational discourses on performance, creativity and innovations, leadership, prevailing societal circumstances, and so forth.

From the realistic perspective, on the other hand, one may ask, "What are the main determinants of the individual creative performance (in a specific contextual setting) and how the organizational environment influences it?" Most likely, these determining aspects are not purely individual or environmental, but systemic. For example, seeing things from new perspectives is probably difficult without an environment allowing, or perhaps even supporting, conflicting ideas. In this way, an individual aspect "posing challenging and critical questions" is related to an environmental aspect "allowing conflicting ideas," which may, when interacting, serve as a determinant. When the element of time (e.g., social rules may change), multiple actors, and different levels of organizations (e.g., groups are

different to individual actors), etc. are introduced, the big picture gets messier. However, it is necessary to try to determine, at least at some level of abstraction, what works and what does not. To do this, we need systems models. In the next section, I will discuss some of the most well-known systems models in the field of creativity research and the related criticism.

Theorizing on creativity from a systemic perspective

The usual way to approach creativity is to break the concept into the so-called "four Ps" of creativity: person, product, process, and press (environment) and consider how these aspects may or may not explain creativity, usually understood as the generation of novel ideas, products, or practices applicable in some context. For example, the product category may serve as a starting point when counting the number of patents, inventions, hit singles, etc. From the person's perspective, for example, motivational factors, can be seen as a driving force of creativity—that should be fostered, in turn, by certain environmental factors (see e.g., Amabile, 1997; Amabile, Conti, & Coon, 1996). From the process perspective, creativity has been investigated at least as problem-solving (Osborn, 1953), problem-finding (Jay & Perkins, 1997), interaction and sense-making (Borghini, 2005; Drazin, Glynn, & Kazanjian, 1999; Woodman, Sawyer, & Griffin, 1993), and knowledge-creation (Huang, 2006; Nonaka & Takeuchi, 1995).

However, the models resting upon the four Ps left us with a number of open questions and apparently conflicting views. For example, such environmental attributes as "time" and "competition" have been found to be both facilitative and detrimental in different contexts (Runco, 2004, p. 662). This is the case although the concept of "time pressure" has gained much attention during recent decades of research (Hennessey & Amabile, 2010, p. 585). In addition, the four Ps do not provide any way to explain the relationships between the different Ps (Watson, 2007, p. 425). Criticism of the four Ps has led to the formulation of the systems approach.

In the field of creativity research, the systems approach has provided some of the most ambitious attempts to capture what is creativity or where it is (see Csikszentmihalyi, 1988, p. 325). The systems view has made two important contributions: first, it has helped to explain the interactions between the creator and the social context over time, and secondly, the model is rich enough to correspond with the organization's complexities (Ford & Gioia, 2000, p. 707–8). Among the most notable systems approaches to creativity are Csikszentmihalyi's (1988, 1999) systems model of creativity and the evolving systems approach by Gruber (1981; see also Gruber & Wallace, 1999). The former focuses on describing the dynamics of creativity within a social and cultural context, whereas the latter focuses on the development of the individual creator's career.

There are also models that are not explicitly defined as systems models, but share similar kinds of holistic and multilevel perspective as systems models. For example, Woodman et al. (1993) suggest that organizational creativity is a complex process resulting from the interaction of individuals and groups in different organizational contexts. The componential model of creativity by Amabile (1983, 1997) suggests that creativity is a sum of three elements: domain-relevant skills, creativity-related processes, and intrinsic motivation. In all these models contextual factors, such as organizational climate, leadership, resources, etc., are taken seriously, as are personal determinants to creativity (see also Puccio & Cabra, 2010).

As the most popular and widely spread systems model of creativity, Csikszentmihalyi's (1988, 1999) DFI-model (Domain, Field, Individual) serves as a good example here. DFI-model encompasses three interrelated subsystems that jointly determine creativity: 1) the cultural domain of symbolic rules, 2) the field of disciplinary experts, and 3) the individual using the cultural symbol system. The model suggests that creative ideas cannot be attributed to any single entity but are a result of the interaction of several elements.

As we remember from the previous section, a good systems model includes a description of the key dynamics (mechanics or processes) that make the system work (cf. Pickel, 2011, p. 247).

For example, Csikszentmihalyi (1999) describes the dynamics of creativity in the context of evolutionary theory. He parallels the dynamics of the systems with that of evolutionary variation and selection. In evolutionary terms, individuals produce variations, which are either rejected or selected by the environment and in the latter case transmitted to the next generation. In Csikszentmihalyi's model the variation correspondences to individual contribution, the selection to the gatekeeper role of the field, and transmission to the contribution of an idea to the domain (p. 316).

Besides the critique presented by Weisberg (2006, see the second section), other critics have pointed out that Csikszentmihalyi's model is too qualitative and broad for conducting studies with unambiguous testing (Kozbelt, Beghetto, & Runco, 2010, p. 40). It is, of course, the besetting sin of the systems models that they are too general and conceptual and often mere analogies instead of being based on the concepts and empirical evidence of the subject matter itself (see Wiio, 1996, p. 13). However, in generality lies also the strength of the systems models: they may be useful across many fields and even disciplines, but the modeler needs to be cautious when applying a very general model to some specific areas of inquiry. General types of models need to be constructed so that there is room left for contextual adjustments. Some of the elements may be relevant, but not all of them; some may be more relevant than others. The essence of a good systems model is that it should provide some kind of useful description, either qualitative or quantitative, of the most important aspects and their relations (parts and their attributes) and key dynamics or mechanisms "to find out how systems work" (Bunge, 2004, p. 207). Static or descriptive models are always only partial descriptions of the phenomenon. Systems may exhibit rabid changes and adaptation to their changing environments. Next, I will turn the discussion to complexity theory and the review of some interesting and important studies of creativity informed by complexity theory.

Complexity theory

Ståhle (1998, 2008) has identified three historical systems paradigms. The first one considered closed and cybernetic systems and was aimed at controlling and steering the systems. The second focused on open systems and emphasized equilibrium and the exchange of energy and information with the environment. The third began in the 1960s and focused on dynamic systems' capacity to self-organize and exhibit chaotic and unpredictable features and behavior (p. 122–3). Complexity theory represents one of the quite recent research traditions within the systems sciences and can be seen as a continuation of the dynamic systems paradigm.

Complexity theory focuses on complex systems and their self-organizing, emergent behavior. Originating at Santa Fe Institute in New Mexico in the early 1980s, this young discipline is largely based on the life sciences, such as biology (Kauffman, 1993, 1995), and adaption and computer modeling (Holland, 1995). Central to complexity theory is the idea that the system, having many interconnected and networked autonomous agents, may exhibit coherent emergent behavior as a collective. The system as a whole is also capable of adapting to its environment (Holland, 1995). These kinds of systems can be called complex systems. As distinct to classical systems theories, complexity theorists emphasize exploratory research, explanation, and understanding instead of prediction and control of the systems (Gatrell, 2005). Similarly, they strive for breaking down the division between the dichotomies of material-social, structure-agency or micro-macro, etc. (p. 2663). According to Byrne (2005, p. 97), the following "working definition" can be given to complexity theory: "the interdisciplinary understanding of reality as composed of complex open systems with emergent properties and transformational potential."

The term complexity derives from the Latin word "plectere" meaning "interwoven" or "intertwined." Complex is not synonymous with complicated since complexity cannot be accurately analyzed by breaking the system into parts, whereas the behavior of complicated systems can always be, at least in theory, fully described (Cilliers, 1998, p. 3). Complexity has many different definitions; it can be thought as a measure of how hard it is put something together starting from elementary parts, or be seen as the complexity of causal relationships that may be at minimum mutual, recursive, and circular

(Montuori, 2011, p. 415). For complex systems, such as social systems, it is also typical that they have many parallel mechanisms operating at the same time (Bunge, 2004). One of the definitions for the complexity of a system is its degree of connectivity: the higher the degree of connectivity (the amount of connections and interactions), the more complex the system (Kauffman, 1995).

Complexity scientists are especially interested in finding some common characteristics or principles describing how order emerges spontaneously from the interaction of many agents and how agents co-evolve in complex systems (Mitchell, 2006). The spontaneous interaction leading to the emergence of new order is called self-organization. Self-organization refers to the system's ability to create its own organization independent of any top-down control system by following some simple rules enabling collaboration (Mitchell, 2009, p. 13). Emergence is what happens when the system self-organizes. It is the process by which patterns or global-level structures arise from interactive local-level processes (e.g., Lichtenstein, 2000). Emergence is often associated with the notion of holism, the idea that "the whole is more than the sum of its parts." However, since the whole can be more or less than the parts, a better expression would probably be that "the whole is [the] emergent property of . . . the interacting parts of the systems" (Montuori, 2011, p. 418).

Although in many ways connected, complexity theory is not the same as chaos theory. According to chaos theory, simple and deterministic systems may exhibit complex and chaotic behavior that is unpredictable; in complex systems, it is quite the opposite (I. Stewart, 2002, p. x). Many natural systems are chaotic and thus sensitive to initial conditions. For example, in the weather system, tiny changes in the initial conditions may iteratively lead to big consequences, or, as the famous expression puts it, a flap of a butterfly wing can cause a hurricane (Lorenz, 1963). When studying complex systems, sensitivity to initial conditions or chaotic behavior are not, however, the first things to consider. Instead, it is the robustness of the system that is of interest, i.e., why the system has a capability to perform and survive under different conditions (Cilliers, 1998, p. ix).

One of the great promises of complexity theory is that one day it would reveal a group of unifying features concerning all kinds of complex systems (see e.g., Miguel et al., 2012). The field of complexity is still young, and it is much disputed whether such principles are applicable across different disciplines (Mitchell, 2009; see also Byrne, 2005; Richardson, 2011). For example, Byrne (2005, p. 97) points out (in the context of social sciences) that explanations are always local in time and place and causes are complex and contingent. More specifically, concrete biosocial systems at different time-scales and environments may differ from each other in their basic properties, structures, and processes to an extent that a range of different systems theories is needed to explain their behavior (Pickel, 2011, p. 246). Therefore, it may be reasonable to acknowledge that not every perspective of complexity is equally useful or applicable in any context (Richarson, 2011, p. 375) and that knowledge of the systems is contextual (Byrne, 2005).

The other critical notion that must be made relative to complexity theory is the use of metaphors. Researchers using complexity theory in the context of the social sciences should be extremely cautious when applying complexity concepts. The roots of the theories and concepts used in complexity theory are in mathematics, not in empirical sciences (Capra, 2005). We have no reason to assume that social phenomena follow theses mathematical abstractions. The use of complexity theory within the social sciences has been so far dominantly metaphorical. However, whether metaphorical or analytical, the usefulness of complexity concepts should be determined by social research and debates rather than by complexity meta-theory (Stewart, 2001). This view of complexity highlights the importance of critical reflection in grounding the models and perspectives, as stated by Richardson (2011, p. 375). Therefore, the main reason for adopting the complexity perspective is not to "blindly" apply complexity concepts, but to shift the focus from "whole-part" dichotomies toward conceptualizations allowing for more complex orderings (Pickel, 2011, p. 248). I will next review some of the most interesting findings that have been made in the intersection of chaos and complex systems studies and creativity research.

Complexity and creativity

Complexity theory may provide new insights and thus enrich the descriptions of creativity in context. I will discuss next some of the complexity concepts that have been recognized with relative to creativity. The discussion is divided into the levels of individual, group, and organization.

Individual level

Some of the earliest works related to complexity theory and creativity are the studies derived from chaos theory (e.g., Abraham, 1996; Guastello, 1995; Richards, 1996; Zausner, 1996). These mostly metaphorically oriented works (with the exception of Guastello, 1995, 2011) use such concepts as "edge of chaos," "bifurcation," "attractor," "the butterfly effect," and "self-organization" to explain creative transformations.

For example, Zausner (1996) has speculated about the connection between chaos theory and art from the point of view of a creative personality. She uses the word chaos to designate "a state of activity that calls forth new combinations of order" (p. 343). She considers creativity as an entropy-reducing activity organized by the open systems of the creative person (entropy understood as a degree of uncertainty at a given situation). Thus, artists take in energy and information from their environments and transfer them into pieces of art as local examples of order. For creativity to exist there must be an exchange of energy in operation, and the works of an artist should not resemble each other too closely. Zausner discusses the relevance of many other complexity concepts, but on a speculative level. She, for example, suggests that creating a work of art is an iterative process whereby in each state of iteration the work is compared to itself drawing the trajectory for the future evolution of the work. Similarly, she suggests that finding the balance between positive and negative feedback mechanisms is crucial for creative production.

Abraham (1996) has suggested that three different kinds of bifurcations (points of possible change in a system's state) may be involved in creative processes: subtle, catastrophic, and explosive bifurcation. In subtle bifurcation, the bifurcating attractor—a system's state or structure—appears as a subtle transition; in catastrophic bifurcation, the attractor simply appears or disappears; in explosive bifurcation, the attractor changes its size (p. 373). Abraham also discusses the role of divergent and convergent thinking in cognition stating that both are relevant to the creative process. For example, divergent thinking is not of much worth without the ability to integrate the ideas and tell good ideas from bad ones.

Csikszentmihalyi (1996) has described "complexity" as the distinguishing characteristic of the creative personality. He gives examples of polar traits ruling the creative mind: creative people are smart, yet they are naive; they are energetic, yet quiet and restful, they are playful, yet disciplined, etc. (p. 57–73). The idea that both capacities are needed is also supported by the recent theories on the "dual-processing of human cognition" (Chaiken & Trope, 1999; see Gabora & Kaufman, 2010, p. 285–6). This complexity of the creative mind or the position at the "edge of chaos"—a region between order and randomness—may help in understanding why persons tolerating ambiguity and being open to new experiences may be more creative (Richards, 2010, p. 203). Similarly, the seek for "flow" experiences—an optimal state of consciousness peculiar to creative performers—may explain why creative people are likely to perform at the extreme limit of their skills and concentration in order to bring order to chaos (Csikszentmihalyi, 1996, p. 107–10).

One of the most consistent findings concerning individual creativity is that creative individuals generate more ideas that consist of remote associations (Mednick, 1962; Simonton, 1988). According to Simonton (1988), creativity is a successful chance occurrence, and the creative process is analogous to that of the variation and selection processes in Darwinian evolution. Creativity happens when mental elements self-organize themselves in consistent configurations causing the mental entropy to reduce (p. 393).

Consistent with that finding, Feist (2010) draws a parallel between the remote association thesis and some recent findings of neuroscience according to which the highly creative brain may have more connected and complex neural circuits than the less creative brain (Andreasen, 2005).

Likewise, the cognitive fluency of creative people may result from this complex and interconnected architecture of brain; rich associations are more likely when there are more connections (Feist 2010, p. 119).

A complex systems perspective may contribute to the discussion of the creative process. Mitchell (2006) discusses the complex biological systems' ability to "explore" and "exploit" in an optimally balanced manner. According to Mitchell, complex systems in biology are able to fluidly adapt their exploration and exploitation processes by adjusting the resources given to a certain strategy. While the system gathers more information, it learns to give more weight to successful strategies. According to Mitchell, this evolution leads to the shift of the optimal balance over time: early explorations are based on little information and they are largely random and unfocused, bottom-up searches; as information is obtained and acted on, the search becomes more focused and top-down in alignment with the system's feedback mechanisms (see also Hofstadter & Mitchell, 1994; Holland, 1992).

Mitchell (2006) refers, for example, to the immune system as an example of an "intelligent" biological system. The search for pathogens is conducted by "lymphocytes" (a type of white blood cell) of which the most successful ones are given more weight in subsequent offspring. At the same time, less promising searchers are nevertheless not completely replaced. In this way, the system utilizes randomness. The other example that Mitchell discusses is ant foraging. Initially ants explore food in random directions, and once food is found, pheromones act as a feedback mechanism drawing others to the spot. However, due to many random elements, some ants keep on walking their individual paths while occasionally bumping into serendipitous food sources—a phenomena also discussed within creativity research (see e.g., Boden, 2004; Mednick, 1962).

Group level

Guastello (1995) has empirically studied creative group performance from the perspective of nonlinear dynamical systems theory. He assumes chaos, rather than randomness, as a decisive factor leading to self-organization and instability of creative problem-solving groups, which are systems "at the edge of chaos" (p. 321). He found that creative processes are "instability increasing" and that feedback channels were essential for the group's creative performance. According to his finding, opening up feedback channels is essential instead of offering information on a "need to know" basis as it stifles spontaneous action (p. 326). These findings also challenge the role of rewarding, task definition, and detrimental social phenomena (such as social loafing) as the main proponents for explaining the effectiveness of group performance (p. 365).

In comparison, Nemeth, Personnaz, Personnaz, and Goncalo (2004) have shown that creative group work is actually boosted by dissent, debate, and competing views rather than the common "not to criticize" attention of brainstorming groups. In their multi-country experimental study, they compared traditional brainstorming instructions with instructions encouraging people to debate and criticize. They found that the value of debate instructions was superior to traditional brainstorming instructions. Thus, the role of conflicts in creative processes is much more complex than has been previously suggested by traditional group creativity research (e.g., Osborn, 1953; Paulus, Brown, & Ortega, 1999). A normative environment that permits people to disagree may liberate people to be more creative by allowing otherwise banned discourses to emerge and stimulating additional ideas through competing views (Nemeth et al., 2004, p. 367).

Sawyer has studied creativity in the context of improvising groups (e.g., Sawyer, 1999, 2003, 2010). According to Sawyer, creativity is a systemic phenomenon emerging from the interaction of the members of the group (1999). The improvisational setting making group creativity possible is achieved when no structured plans or leaders are used. In improvisation, one should also avoid controlling the stage too much and restrict developing too many expectations of what others will say (p. 451–5). The idea is to listen and leave space for everyone to contribute (p. 451). In a manner similar to the described above, relative to exploration and exploitation strategies, every individual can contribute to the common pool of ideas, but the development of ideation is always

subject to the group's acceptance or rejection of the suggested contribution. In this way, the creative output of a group is not reducible to the mental states of the individual members but collaboratively emergent (Sawyer, 1999).

Organizational level

Organizational level creativity has probably been theorized most from the complexity perspective (see e.g., Montuori, 2011; Sawyer, 2007; Stacey, 1992, 1996; Ståhle, 2008). Common to these mostly conceptual and/or case-based studies are that organizations are seen as complex evolving systems of collaborating people that retain in turbulent environments necessitating adaptation and creative responses. Creativity is seen generating instability in organizations when new ideas change the present modes of operation and pose challenges to the leaders of an organization (e.g., Stacey, 1992). Utilizing the instabilities and coping with conflicts caused by the threat creativity may pose to the system's own power structures are big challenges in organizations (Ståhle, 2008). The dominant view of organizational creativity has reflected closed systems paradigm according to which creativity is seen as an exception from the system's state of equilibrium (Montuori, 2011). In contrast, in open systems, change is their way of being and sometimes they need to go through periods of disequilibrium in order to adapt to their changing environments (p. 418).

The study of social networks provides another interesting complexity perspective to organizational creativity. Organizations can be considered as emergent communication networks in which the connections are easily formed, maintained, broken, and reformed (Monge & Contractor, 1998). This communicational interpretation of an organization is consistent with the systems theoretical view (Stacey, 1996, 10). Network perspective has gained extreme attention after being revived in the late 1990s. Indeed, some complex systems scientists believe that networks point to universal properties and structures of living systems (e.g., Pierpaolo & McKelvey, 2011, p. 258).

In the field of creativity research, the network approach has also become quite popular (see also Poutanen & Parviainen in this proceeding). Some of the recent findings suggests, for example, that a wide and loosely connected network structure (the one that has preferably more weak than strong ties between the members) increases creativity (Perry-Smith, 2006). From the individual perspective, weak ties may foster creativity, but since the person's creativity may lead to higher centrality in the network over time (e.g. due promotion), centrality may become constraining at some point (Perry-Smith & Shalley, 2003). The other studies state that the enhanced ability to share information within the small worlds (tightly connected clusters; see Watts, 2003) may foster creativity, at least up to a certain point (Lee & Marx, 2006; Uzzi & Spiro, 2005).

Summary of the findings

The complex systems approach to creativity suggests that creativity arises from the collaboration of several different actors, be they neurons, individuals, groups, or organizational departments. Independent of the scale, the flow of information, some level of randomness, and self-organization of the elements are necessary for entropy-reduction and for local examples of order to emerge. Creativity is an emergent phenomenon, i.e., it is not reducible to the constituent parts, but is something qualitatively novel.

There are two main mechanics in operation in the creative process: divergent thinking (variation /exploration) and convergent thinking (selection /exploitation). Divergent thinking is used for exploring and generating new ideas and convergent thinking is used for testing and integrating them. Along with the increasing understanding of the problem at hand and the novelty needed for its solution, the balance between these two processes shifts. At the early phase, much randomness is needed when the problem space is explored. This is best done through bottom-up searches by individual agents. Later on, when more information is attained, a more focused search is needed. Communication and feedback channels enable individual agents to perform their tasks in a more structured manner. At this phase, the role of top-down decision-making increases.

This dual dynamic of creativity implies the paradoxical nature of it: on the one hand,

creativity increases instability (divergence), and on the other hand it reduces entropy by bringing new order and integration (convergence). Therefore, the creative process is always about change, and the structures may go through subtle or more radical reorganizations.

Organizational aspects, such as admiring some level of confusion and instability, liberating conflict and dissent, coping with the conflicts creativity may pose to existing power structures, and understanding the dynamics of self-organization are essential. Also, structural changes in the environment may help foster creativity. Opening up feedback channels fosters information flows and increases randomness and serendipity. Making weak connections possible (e.g., over departmental barriers) and enabling people to organize into small clusters within the community may also provide effective communication architecture for creativity. The centrality of creative people tends to increase over time, so the most talented inventors should probably be kept away from administrative and managerial tasks.

Conclusion

I have discussed the usefulness of systems modeling on a general level and illustrated their applications to creativity research by introducing some of the very basic systems models of creativity. The focus has not been on imposing any specific model, but on providing a framework for constructing one's own systems model of creativity. I have tried to critically assess the value of systems thinking and draw a picture on the conditions under which systems thinking is fruitful.

I have also introduced the basic principles of complexity theory and the complex systems approach and presented some of the important and inspiring findings made in that area relative to creativity research. Byrne (2005) reminds us that the use of complexity theory for the purposes of the social sciences is not of importation but of reconstruction. This means that complexity theory is not a new meta-theoretical construction that is ready to use, but that the tools and theories we already have must be reconstructed "in complexity terms" (p. 98). I believe that the findings made in the area of complex systems provide an important possibility to reframe many cemented "facts" in creativity research.

Creativity research is a theory-rich area. Multiple perspectives, models, and theories have been suggested on multiple levels of organization, such as individual, group, organization, and even societies (see Kozbelt et al., 2010). Creativity researchers must develop more rigorous and empirically plausible theories, while at the same time, let the plurality of the existing knowledge enrich their work.

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Regional development is one of the key aspects of many higher education institutions as well as private and public sector organisations. In educating the future innovators, higher education institutions also need the input of external stakeholders. What constitutes a creative region? Is there such a thing as a creative region? This track concentrates on the processes, methods and cooperation in developing a creative region.

No articles were submitted to the conference proceedings under this title.

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