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CROSS-CULTURAL IMPLICATIONS IN A PROJECT-BASED LEARNING ENVIRONMENT (PBL)

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ABSTRACT

Effective functioning of geographically dispersed, culturally mixed work team is essential for global business success in the era of ICT-outsourcing and -offshoring. It is vital to understand and learn how to do software development in virtually supported intercultural collaboration environments. Therefore, this case study is evaluating cultural differences between Austria and Finland in a context of higher education project-based learning (PBL) environment. Methodologically, our single case study combines a constructive action research paradigm and focused semi-structured student interviews. Our findings regarding English as Lingua Franca (ELF) show that despite this neutral and culture-free approach of intercultural communication, there were still a number of obstacles to overcome due to differences in proficiency, receptiveness and personality structure of the people involved. The findings about Uncertainty Avoidance (UAI), Power-distance (PD), Individualism (IDV) and Masculinity Index (MAS) are all in line with the previous suggestions in literature where Finns are regarded to score lower in both UAI and PD compared to their Austrian counterparts. Moreover, the results reflect Austria's high rank in the MAS index with students being both demanding and assertive during the team-building process but also throughout the project.

KEYWORDS

cross-cultural, intercultural, project-based learning, higher education, ICT

1. INTRODUCTION

With the help of today's online technology, we can easily and cost effectively combine people from geographically dispersed and distant cultures as one virtual intercultural team. In practice this kind of networked and team based virtual structures have already challenged the traditional hierarchical organization (Shokley-Zalaback, 2002). Over the past twenty years companies have been using ICT-outsourcing and -offshoring as a way of improving both effectiveness and efficiency. As a result, a significant share of ICT related jobs have been transferred from high labor cost western countries to low labor cost countries such as India and China. In our opinion, therefore it is vital for ICT-students to understand and learn how software development is done in virtually supported distributed development environments. ICT students must be prepared for their professional careers by getting opportunities to experience software development collaboration via virtual online collaboration (adopted from Burniske and Monke, 2001). Generally speaking, there seems to be a clear lack of studies focusing on this kind of cross-cultural (or also known as intercultural) learning collaboration.

In this case study, we are particularly interested in evaluating a virtually supported software development process in the context of higher education studies. In order to understand cross-cultural challenges in a project-based learning setting, our experiment takes place between Universities of Applied Sciences in

Austria and Finland. By combining constructive action research and focused semi-structured interview methods, we are trying to create a comprehensive understanding about the team-building process of an intercultural student team project in the field of ICT.

This paper is organized as follows. First, we introduce theoretical foundations of intercultural learning including strengths and weaknesses of intercultural collaboration. Then we continue our theoretical introduction by defining project-based learning as a learning method. Secondly, we present our research design including research objectives, experimental learning settings and construction of key measures based on established cultural differences in general with special focus on Austria and Finland. Thirdly, we present our results based on semi-structured interviews with both the students and professors and the constructive action research observations by the authors of this study. Finally, we discuss and conclude our findings.

2. INTRODUCING THE THEORETICAL FOUNDATIONS

In this study we address both a cross-cultural and intercultural approach. Whereas the term cross-cultural refers to contrast and comparison of two cultural groups, intercultural describes what happens when people with different cultural background meet, interact and communicate with each other. In this study a critical approach is taken from either side comparing and contrasting Austrian and Finnish cultural attitudes and drawing conclusions from their intercultural activities. Giving an introduction into the theoretical foundations, we present some existing understandings of the intercultural area of research. In the methodology and construction of the key measures section, we will focus on major cross-cultural aspects.

2.1 Defining Intercultural Learning

Effective functioning of a geographically dispersed, culturally mixed work team is essential for global business success (HofnerSaphiere, 1996). An intercultural team (or sometimes also called multicultural) is a small group of people including two or more cultures and people with complementary skills equally committed to a common purpose, goals and working approach for which they hold themselves mutually accountable (Katzenbach and Smith, 1999, Marquardt and Horvath, 2001). According to Teräs (2007) intercultural disciplines typically include intercultural communication (Gudykunst and Mody, 2002), intercultural training (Landis et. al. 2004) and intercultural education (Räsänen and San, 2005) which also form a foundation for our case study.

In an educational context besides embracing equal opportunities to learn (Banks, 2001), multicultural (or as we define intercultural) learning aims to provide students with the skills, attitudes and knowledge they need to function with their own culture and across all other cultures while doing software development in collaboration with other team members (modified from Teräs, 2007).

2.2 Strengths and Weaknesses of Intercultural Collaboration

It is common knowledge that online collaboration allows students to develop their technical skills and become more receptive to the capabilities of foreign students (Grosse, 2002, Odenwald, 1996). Students working in intercultural teams learn to negotiate, make group decisions and synergy explore different perspectives and sort out differences in online etiquette (Eastman and Swift, 2002, Adler, 2002). These all are important skills when students enter working life and start collaborating with foreign co-workers or customers. While experimenting with various asynchronous and synchronous communication methods, students understand the advantages and disadvantages of different communication channels and are able to sharpen their communication skills (Zhu et. al. 2005).

A significant body of research has studied cultural diversity and team outcomes and produced mixed and often contradictory results as summarized by Stahl et. al (2010). Besides extensive literature review, their meta-analysis study evaluated how task complexity and structural aspects of the team including team size, tenure and dispersion is moderating on cultural diversity in teams. According to their result, cultural diversity leads to process losses due to task conflict and decreased social integration, but has also positive effects owing to increased creativity and cultural diversity.

2.3 Defining Project-Based Learning (PBL)

Project-Based Learning (later PBL) is a teaching and learning approach where students are engaged in investigative activities, in the pursuit of solutions to non-trivial problems under the context of a project (Blumenfeld et. al.1991). Although it can be an individual or group activity (Donnelly and Fitzmaurice 2005), research tends to address it under the perspective of collaborative team-work (Collis 1997, Hadfield et. al. 2007, Lam et. al. 2010, Heo et. al. 2010).

Besides collaboration and cooperation (Helle et. al. 2006), PBL includes also other key elements. *First*, there should be either a question or problem that drives the activities within the project; these activities should generate artifacts or products addressing those driving questions (Blumenfeld et. al. 1991). *Second*, projects should include complex tasks which involve students in design activities, problem solving, and decision making, in a setting where students have autonomy of their actions and working over an extended period of time (Thomas 2000). *Third*, projects should be authentic representations of real-life situations containing real-life problems (Chinnowsky et. al. 2006, Heo et. al. 2010). *Fourth*, learning in PBL should be a constructive process where in the pursuit of solutions for open-ended problems, students extend their existing knowledge with new concepts and new meanings when connecting theory with real-life situations (Chinnowsky et. al. 2006). This form of learning has its roots in the theories of John Dewey where learning originates from practical experience (Lam et. al. 2010).

PBL should not be confused with Problem-Based Learning, another widely studied learning approach with similar characteristics. According to Donnelly and Fitzmaurice (2005) PBL and Problem-Based Learning share several characteristics such as 1) open-ended questions as the driving factor in the project (or problem), 2) authentic representations of real life situations and 3) a constructive learning process which typically occurs via collaborative team-work. Donnelly and Fitzmaurice (2005), on the other hand, point out two key differences: *First*, PBL is more focused on achieving the expected end products, while in the case of Problem-Based Learning the focus is on the inquiry, research and critical-thinking processes that students undertake when dealing with the problem. *Second*, in PBL the major driver of activities is the project which can include multiple problems, while in the case of Problem-Based Learning, a set of activities is started in response to a stated problem. Moreover, Problem-Based Learning does not necessarily culminate in an end-product (Helle et. al. 2006).

2.4 Benefits and Challenges for students in PBL

There is a lack of proper statistical evidence of PBL benefits in the literature since most of the articles on PBL focus on describing the implementation of PBL courses (Helle et. al. 2006) like our case study. With this disclaimer in mind, positive impacts of PBL found in the literature are given.

By investigating and seeking solutions for real-life problems, students acquire a deeper understanding of key principles and concepts, which then help improve thinking competence and create links between theory and practice (Blumenfeld et. al. 1991). Other authors have argued very similarly. According to Thomas (2000) comparing PBL to traditional teaching methods increases understanding in the subject-matter, supports critical thinking skills and gains in problem-solving capabilities and academic achievements. Likewise Helle et. al. (2006) continued the list with increased conceptual understanding, knowledge and inquiry skills but also with positive student satisfaction, more durable retention of the acquired knowledge and an increase in self-confidence. Donnelly (2005) on the other hand reported team-building skills as a benefit.

Despite this promising list of PBL benefits, literature reports a great deal of challenges both for students and teachers. On a general level, a wider adoption of PBL requires proper ways of supporting teachers and students (e.g. Blumenfeld et. al. 1991). More specific challenges include the high levels of time-consumption in the organization and administration of project-based courses (Helle et. al. 2006), efficient management of group processes and communication (Collis, 1997), supporting and maintaining teacher and student motivation (Herman and Gomez 2006, Lam et. al. 2010).

There is also a need to select suitable projects that are acceptable for learning and which can be aligned with the objectives of the course's learning outcomes (Helle et. al. 2006). Besides selecting a suitable project,

there is also a need for the design of appropriate scaffolding methods, support for the student's learning process, anticipation of workload and issues in group dynamics (Helle et. al. 2006, Thomas, 2000). Assessment and student grading is also seen as a challenging aspect that can have major impact on students' motivation.

Different studies discuss how students try to get credits without contributing to the group work and how teachers have to cope with limitations in assessing individual learning processes (Matsuura, 2006). This might lead to a situation where teachers do not have sufficient grounds to evaluate individual contributions and when all the members in a group receive the same good grading, the motivation of the students that actually contributed to the work is decreasing (Matsuura, 2006). Therefore Helle et. al. (2006) after listing group dynamics and grading as a challenge in PBL concluded that as general rule students' assessments should include both an individual component and a group component.

2.5 PBL in ICT studies

PBL is considered as an effective and valuable method to teach ICT subjects (Stroulia et. al.. 2011) and therefore it has become a widely used learning approach at the level of undergraduate ICT studies (Pucher and Lehner, 2011). There are several studies which describe and discuss how to design and implement PBL into ICT subjects (Domínguez and Jaime, 2010, Hadfield et. al. 2007, Fernandez and Williamson, 2003, Davenport, 2000) and how to evaluate team work and individual contribution in ICT PBL courses (Hazzan and Dubinsky 2010, Matsuura, 2006, Hayes et. al. 2003), which in general were identified as a challenge in PBL. There are also studies which evaluate tools and support approaches regarding team formation and team work (Ardaiz-Villanueva et. al. 2011, Chen and Chong 2011), tools for guidance and learning (Köse, 2010) or asynchronous communication platforms which support student engagement and learning (Heo et. al. 2010, Koh et. al. 2010).

3. RESEARCH DESIGN

3.1 Research Objectives

This case study evaluates cultural differences between Austria and Finland in a context of higher education emphasizing on an ICT-project. In order to develop better teaching solutions for intercultural PBL settings, there is a need to better understand the challenges of building ICT-student teams, which are partially managed by a foreign partner. In this case study we are especially interested to evaluate ICT-students initial expectations before and immediate reactions after meeting foreign partners face-to-face. Thus, this study focuses only on the very first steps of the software development project process when the customer presents the objectives of the project and when collaboration between the student development team and foreign partner kicks off. In practice, we were trying to identify what kind of team building issues need to be addressed with regard to intercultural teams and what kind of challenges might occur. Finally, we were trying to identify what kind of presence and behavioral patterns Finnish Teachers acting as customers have compared to their Austrian counterparts from the Austrian Students' point of view.

3.2 Research Approach

Our single case study (Yin, 1994) combines a constructive action research paradigm (e.g. Kasanen et. al. 1993) and focused semi-structured student interviews. According to Jaatinen and Lavikka (2008) constructive research aims to develop a solution to a practically relevant problem by applying theoretical knowledge and demonstrating the functioning and innovativeness of the suggested solution. To evaluate suitable theoretical frameworks for cross-cultural collaboration in a context of PBL, computerized searches to several different scientific journal databases were conducted and as a result relevant theories were selected. In action research besides data collection for scientific purposes, researchers play an active role in

development and implementation efforts. Therefore, authors of this study co-developed and co-implemented the Austrian project-based learning course which was acting as a learning environment of this study. Furthermore, the Finnish teachers had previous experiences in guiding Finnish student teams within a similar project environment and therefore had a solid foundation to compare Austrian student behavior with the Finnish ones. Also both Austrian supervisors were drawing on extensive experiences made with students in similar project settings, however, in a fully Austrian environment only.

Intercultural research divides learning into two categories: didactic (information-giving) and experiential learning activities (Kealey and Protheroe, 1996). Our case is considered as experiential case with PBL approach (Peterson, 2004), which is known to improve learning and positive attitudes (Ravenscroft, 1997), allows participants to gain knowledge from social interaction (Vygotsky, 1978, 1986) and encourage enthusiasm and develop critical thinking skills (Major and Palmer, 2001), which are key elements for a successful software development process.

3.3 Sample Selection and Experimental Learning Setting Description

Experimental settings for our case study included 9 bachelor students from the University of Applied Sciences Upper Austria in Hagenberg. Students from Austria were randomly selected for this project had no previous intercultural experience with Finland. The mandatory project course for students started in March 2012 and will end in January 2013 resulting in 6 credit points for each student. During the project course Austrian students are further developing an existing and extensive web service, which had been developed by multiple groups of Finnish ICT students during 2008 to 2011. At the moment the web service is actively used in Finland by various Universities of Applied Sciences. The aim of the Austrian student project is to develop, test and release an improved version of the existing web service. Besides streamlining the existing functionalities and making the graphical user interface (GUI) more user-friendly, the additional aim is to define and develop a new set of functionalities and conceptual approaches, which would increase the interest and extent of the usage towards the web service in question.

Besides students, two teachers from both Austria and Finland participated in this study as action researchers and partial co-developers. The interviews and observation data were collected during March and April 2012 and therefore as stated in the research objectives our case study covers only the students' initial expectations before and immediate reactions after meeting the foreign partners face-to-face. All interviews were recorded and partly transcribed and then analyzed by taking a qualitative research approach. After ample reduction of the analysis, conclusions were drawn from the coded data. Regarding the additional observations made by action research teachers, all individual observations obtained by each researcher were discussed and compared within the entire research team. Conclusions were drawn once an agreement regarding the observations was achieved among the research group.

3.4 Construction of Key Measures

Cultures and cultural patterns can be described and measured along cultural dimensions or typologies as defined among the many other researchers, e.g. Hall (1976, 1997), Hofstede (2001, 2005), the GLOBE Study (2004), Kluckhohn and Strodtbeck (1961), Schwartz (1992, 1999), Trompenaars and Woolliams (2003) or Hampden-Turner (1997). All these cultural models have taken a cross-cultural perspective where certain values or behaviors are found to be generally typical of certain groups of people. Individual variations are of minor importance in cross-cultural research. The theoretical foundation of our research setting and observations lies in the original cultural paradigm proposed by G. Hofstede (1980) and Hofstede (1991). In order to keep this paper focused, other cultural dimensions were not included in this illustrative review.

In his detailed study conducted among hundreds of IBM employees in 53 countries Hofstede (1980) identified the following five key dimensions which are shortly outlined below. (Power-distance (PD); collectivism vs. individualism (IDV); femininity vs. masculinity (MAS); uncertainty avoidance (UAS); long- vs. short-term orientation). Besides introducing the key variables, we will also shortly compare the possible differences between Austria and Finland. *Power Distance* (PD) is concerned with the distribution of power and attitude towards inequalities amongst citizens. A high score in PD indicates a general acceptance of

unequal distribution. Whereas individualistic cultures tend to be lower on PD, collectivistic cultures seem to rank higher in terms of power distance. According to Hofstede's finding both Austria and Finland score rather low in this dimension. *Individualism* (IDV), regarded to be the most prominent facet of cultural variation (Triandis, 1994), is associated to the relative importance of the group in society. Collectivistic countries (low IDV), prefer in-group goals to personal enrichment; this approach is valued by more traditional societies (Hofstede, 1991). Western cultures are mainly characterized by high scores in IDV having weaker ties of group cohesion and less loyalty to groups beyond family and close friends. In terms of this dimension Austria and Finland seem to have a very similar approach towards individualistic values. *Masculinity* (MAS) "expresses the degree to which dominant values in societies is masculine" (Hofstede, 1980, 46). Whereas ambition, acquisition of money, competition, and assertiveness rank among masculine values, low MAS cultures embody feminine values like modesty, cooperation and improvement of quality of life. Austrian culture is strongly positioned towards the masculine pole (scoring 79) compared to the Finnish culture (scoring 26). *Uncertainty Avoidance* (UA) considers the extent to which societal members feel threatened by change or are reluctant to accept novel or ambiguous situations. High UA cultures tend to avoid risks, whereas low UA cultures seem to accept different differences in perceptions and values better. Austria scores relatively higher (scoring 70) on UA than does Finland (scoring 59). As a summary, above comparison analysis suggests that Austrian ICT students would be more inclined to take a competitive and less team-oriented approach than their Finnish counterparts.

4. FINDINGS AND DISCUSSION

4.1 English as Lingua Franca (ELF)

Since the Finnish participants could neither speak or understand German and vice versa, the communication between the Austrian students and their Finnish partners was carried out in English. Communication included various synchronous and asynchronous methods such as face-to-face meetings, web meetings, email, on-line group chatting and different formal written documents such as project plan and definition documentation. As the Finnish partners had extensive experience in international collaboration both in written and oral communication, the language issue did not cause any difficulty even though English was not their mother tongue. Yet both participants had a clear accent, which was different when comparing to typical German or English speaking people.

Our observations regarding the language are in line with the previous suggestions in literature. As a result, the use of English as a Lingua Franca (ELF) was of vital importance which is in general not only a threat to multilingualism (House et. al. 2004) but also a decisive factor in the team-building process due to the vast differences of language skills. The Austrian professors having a closer relationship to their students and therefore also more understanding of individual student behavior, noted a change of personality when it came to code-switching. Most of the students were not used to communicating and making their points in English. Some had fierce discussions in German and the moment we switched to English, they remained silent and only reluctantly uttered a few words. When addressed with this observation, the students argued that both the lack of appropriate linguistic skills and the insufficient possibility of using the English language outside a learning environment were responsible for their reluctance. Thus, the students whose language skills were superior to those of their colleagues gained a dominant position within the group when discussing with the Finnish partners. According to our observations and student interviews, this phenomenon gave a substantial rise to complications and irritation within the student group, thus lowering the team spirit and making team building more difficult.

4.2 Findings Regarding Uncertainty Avoidance (UAI)

All students participating in the study had mixed feelings regarding this project. Some were highly enthusiastic due to the expected improvement of their English skills as the Lingua Franca of this project was supposed to be English. Most interviewees expressed their concern about the uncertainty of the project which

even resulted in some fear and unpleasant feelings. As expected from the vast literature about cultural dimensions (Hofstede, 1984, Schwartz, 1994, House et. al. 2004) the approach of the Austrians towards this unknown venture was a more skeptical one due to the higher ranking of uncertainty avoidance (UAI). It became evident that their tolerance for uncertainty and ambiguity was rather low and that they felt uncomfortable in this unstructured situation due to a lack of strict rules which was not provided by the Finnish partners. Since the very beginning of the project also included collaborative development and brainstorming between the Austrian students and the Finnish partners, the students' strong tendency to avoid uncertainty was making collaboration somewhat more difficult comparing to similar situations in Finland. A great amount of effort was devoted to answering and dealing with why-questions instead of seeking solutions and providing answers to how-questions, which brainstorming and collaborative development processes typically include. This approach remained consistent even after the students had been provided with extensive written material regarding the background of the web service and after a two hours presentation about the projects goals given by the Finnish partners. The reluctance expressed by Austrian students to search for immediate and straight solutions for given "challenge boundary box" compared to their Finnish counterparts became increasingly evident to the Finnish teachers. The learning approach followed by the Finnish supervisors did not include any readymade task lists of how students should organize their work or what exactly the outcomes would be, which caused a certain unease among the students who were obliged to step outside their comfort zone. .

4.3 Findings Regarding Power distance (PDI)

The authors found out that students expected the cross-cultural kick-off meeting to be substantially different. It emerged that students were both surprised and confused by the informal approach of the Finnish teachers. The aim of the Finnish partners was to right away establish genuine co-development relationship where all team members including students and teachers are considered more or less as equal members of the team. In this setting, only the ideas and provided solutions mattered, not the status or hierarchy of the persons involved.

As already noted in the uncertainty avoidance section, students further asserted that they expected clear guidelines and much more focus on target-orientation instead of this soft and informal approach toward forming a constructive team. Most participants suggested that in comparison to Austrians different emphasis was put on this process. The findings reflect the differences in power distance (PDI) between Finland and Austria as the Austrians stressed the importance of their perceived role of teachers of being in charge, controlling the situation and providing a clear set of rules. In the case of international educational collaboration and educational export activities, this observation resulted in interesting outcomes. During the past few years Finland, which according to international statistics has one of most competitive educational and innovation systems has been keen on starting educational export activities using existing Finnish learning methods. This Finnish approach which typically emphasizes solution seeking and problem solving focusing on a lower set of very specific rules on how to do things, might not work as smoothly in other cultures.

4.4 Findings Regarding Individualism (IDV)

As both Austrians and Finns scored quite high in individualism (IDV), there is a similar perception of a group feeling. Individualistic values and self-confident opinions are appreciated and it is good to present one's point of view. Whereas the Finnish teachers were aware of the importance of forming a strong and cohesive group in order to perform well and to meet the project objectives, the Austrians considered the team building process of minor importance. Before meeting the Finnish counterparts cross-cultural issues were given little priority. This perception, however, changed substantially after the kick-off meeting. *First*, as noted earlier the factor English as Lingua Franca (ELF) turned out to play a crucial role in their conversational skills. As a result, most student participants indicated that English as a working language led to their reluctance to engage in conversation and to actively contribute to the project. *Second*, as their expectations weren't met regarding the formal procedure of the kick-off meeting and the students themselves were taking control, the participants identified a further key problem. There was a considerable lack of group dynamics which became even more evident due to the gap in language skills, the intercultural issues and the

different expectations. As a result of a lack of clarity in both responsibilities and roles and owing to the absence of effective communication mutual buck-passing was inevitable.

4.5 Findings Regarding Masculinity Index (MAS)

The biggest difference between Austria and Finland as to cultural dimensions is the score in the Masculinity Index (MAS). Whereas Austria is a masculine country that appreciates competition and assertiveness, Finland scores very low on this dimension. As a feminine nation Finland's dominant values are fairness, solidarity and equality.

After the kick-off meeting Austrian students were disappointed, as they expected a competitive environment where achievements, performance and goal orientation would be predominant. As a result, they were confused about the Finnish approach which was marked by mutual understanding and agreement. To encourage group dynamics, steps were taken to support the relationship building process through face-to-face interviews. Faced with an unusual situation, the students' motivation decreased dramatically hitting a low after the Finnish partners left.

Unable to cope with this unfamiliarity, concerned about losing face and absorbed by their own culture, the students had to invest some team-building sessions to tackle the issues of cross-cultural understanding. At the beginning, half of the interviewees were skeptical if training could help them to sort out their dissonance. It became clear that communicational and cultural issues impacted the building of trust and that further training would benefit the team in terms of cultural awareness and effective communication. The study also found that communication patterns varied between the two countries. Although both countries are considered to be direct and straight-forward in conversation, the Austrian students complained about the missing praise which resulted in a lack of motivation.

5. CONCLUSION

As a result of globalization, collaborative working methods such as virtual teams have become a valuable asset for ICT organizations. Therefore it is increasingly important to learn how to collaborate in a virtually supported distributed development environments. This study presented a limited pilot case for building up an intercultural ICT development team in a higher education context. By examining the fundamental issues that students faced during the intercultural team building process, we have produced an insight that should help to broaden common understanding of these dynamics. Although the consensus among the Austrian student team members was that the major challenge represented communication, there was no negative comment on the intercultural project as such. After the face-to-face interviews any ambiguity was cleared up and students confirmed their high commitment to the project. This became especially noticeable owing to their sudden understanding for the time invested for the team-building process. Most team members affirmed that they drew personal pleasure and satisfaction from this intercultural project and were proud of being part.

These kind of concrete examples and the derived best practices and identified booby-traps based on practical observation are valuable for developing novel ICT-teaching methods. Since our experimental setting was very limited both in sample size, time and content wise, it is suggested that future studies will evaluate this complex phenomenon in more detail. Thus, longer term evaluation of Austrian student team and Finnish partners 'collaboration might reveal new insights and help us to identify short vs. long term effects of such kinds of studying experiments.

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