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Foresight and participant heterogeneity ability to foster radical educational ideas

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Abstract: The Nordic welfare model is facing a significant challenge due the ageing population. This emphasises the need of radical innovations also in the case of wellbeing and security education. Therefore in this study we are evaluating participant heterogeneity and foresight driven idea generation process ability to foster especially radical ideas. Our iterative multi-actor and multi-phased idea generation process resulted following seven main idea themes: 1) multi-cultural and language, 2) learning environments, 3) changing operational environment, 4) development and technological know-how, 5) multidisciplinary and life-long learning, 6) interaction and communication and 7) short term courses. We found some support that participant heterogeneity and alternative scenarios are indeed helping to generate diverse educational ideas. However, most of the generated ideas could be considered as incremental instead of radical innovation from educational system point of view.

Keywords: foresight, heterogeneity, radical idea, education

1 Introduction

The Nordic welfare model is facing a significant challenge in terms of the ageing population (Andersen et. al. 2007). Finland is especially interesting market, since the demographic shift takes place first and more rapidly in there than in the most of the other countries (Laine and Maiväli, 2010). Moreover, among Finns there is a common understanding that existing Finnish healthcare system is not able to meet the future challenges due unhealthy industry structure (Ryynänen et. al. 2004). The expected solutions for these problems are calling out a radical transformation from the existing operational models and move on to do something genuinely novel. By following small incremental improvement strategy is not going to solve the problem. Therefore this process is also putting pressure to the existing wellbeing and security education which apparently also needs to be updated to meet the existing and future challenges while ensuring skilful workforce for the future.

1.2 Research objective and design

In this study we are especially interested to evaluate the innovation needs of the wellbeing and security education in Finland which can be related to independent living. Basically our study has the following two main objectives. *First*, we want to identify the future driven development ideas and the derived holistic themes relating wellbeing and

security education which will ensure skillful and competent workforce for the forthcoming years. *Second*, we are also interested to evaluate what kind and type of ideas in terms of incremental vs. radical innovation scale a diverse and heterogeneity group of informants are able to generate relating alternative future scenarios.

This paper is organized as follows. *First*, we introduce the body of knowledge regarding the theoretical foundations of including incremental vs. radical innovation especially in terms of measuring the degree of radicalness. *Second*, we will present our research design and introduce our data collection process in-detail. Finally, we will present our results and conclude the findings.

2 Theoretical foundations of radical innovation

Generally speaking innovation literature possess multiple definitions for innovation, yet most commonly the term innovation can be related to something new (Huiban and Boushina, 1998), which has been put into practice (Ståhle et al., 2004) while brining value to customers and organizations (Haho, 2002; Urabe, 1988). The classification of innovation itself as either incremental or radical innovation (Dewar and Dutton, 1986) is not without the critics (e.g. Henderson and Clark, 1990) and several overlapping terms and definitions have been proposed such as *disruptive* (Yu and Hang, 2010), *revolutionary* (Abernathy and Clark, 1985), *discontinuous* (Lynn et. al 1996), *pioneering* (Ali, 1994) or *breakthrough* (Mascitelli, 2000) innovation as a close equivalent of radical innovation. According to Leifer et. al. (2001) "*a radical innovation is a product, process, or service with either unprecedented performance features or familiar features that offer significant improvements in performance or cost that transform existing markets or create new ones*" whereas incremental innovation is typically considered as an improvement of exiting offering (e.g. Myers and Marquis, 1969) by introducing minor changes (Henderson and Clark, 1990) .

Typically radicalness of innovation is linked to technological knowledge (Tushman and Anderson, 1986, Afuah 1998), yet there is an increasing support for arguments suggesting that innovation radicalness should be measured via multi-dimensional measures (Green et al. 1995). In this context Dahlin and Behrens (2005) made an effort to measure the radicalness of innovation while summarizing commonly used definitions. According to their study, the previous attempts to measure radicalness of innovation with the help of single factors such as technology cycles (Anderson and Tushman, 1990), trajectories (Dosi, 1982), s-curves (Foster, 1985), hedonic price-models (Henderson, 1993), expert panels (Dahlin and Behrens, 2005) and patent measures (Trajtenberg, 1990) are facing series of practical and conceptual problems. As a result they suggested that invention has to fulfill following three criteria in order qualify as radical innovation: it must be novel and unique thus dissimilar from prior and current inventions. Moreover, it must also be adopted and it needs to influence the content of future inventions. As pointed out above multiple measures can be used to measure the novelty (Green et al. 1995).

As defined in introduction, in this study we are interested to evaluate the radicalness of the future driven wellbeing and security education ideas. According to Santonen et al. (2007) idea is always the starting point, plan or intention for potential innovation, which can turn to innovation as a result of successful execution process. Since the timescale of our study is limited, there is no possibility to evaluate whether the generated and analysed

ideas actually turn into genuine innovation i.e. will meet all the three previous requirements. Therefore we want to remark that in practice we are evaluating potential innovations (i.e. ideas) at the ex ante situation instead of verified innovations and their impact at the post ante situation. Moreover, in terms of radicalness of innovation we are mainly evaluating the novelty of the idea from educational expert panel point of view (Dahlin and Behrens, 2005), thus ignoring the other above suggested dimensions.

3 Research design

3.1 Introducing research design

The selection of foresight methods is a multi-factor process which typically end-up on using five or more different methods while favouring qualitative approaches in a way that the following four fundamental capabilities including creativity, expertise, interaction and evidence are met (Popper, 2008a). *Creativity* is referring to inventiveness of individuals, *expertise* linked to the skills and knowledge of participating actors relating to the selected topic area, *interaction* associated with collaboration among foresight project participants and finally *evidence* grounded on the support of reliable documentation and appropriate analysis which are usually utilized in a form of quantitative methods. In Figure 1 we have illustrated our research design and the related data collection process, which is in the following discussed in detail.

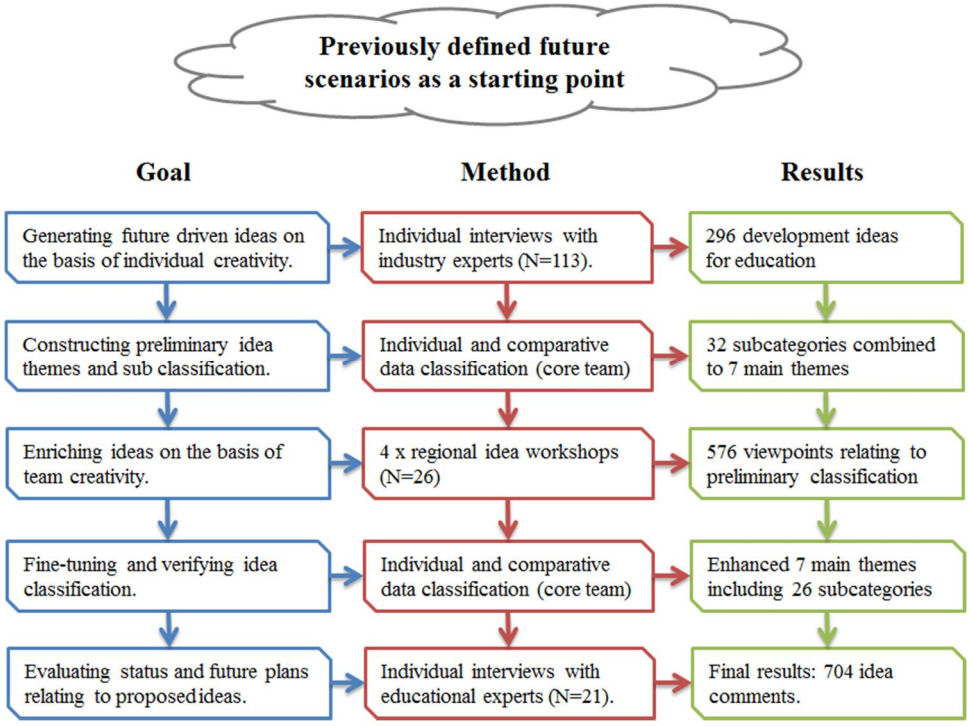

Figure 1 Research design illustration

3.2 Defining the future scenarios

Prior to the data collection of this proposed study, we had conducted an extensive multi-client scenario process during 2011 and 2012, which provided the foundation for data collection of this study. The prior process included altogether 3 national workshops and 5 regional workshops in regions which differed significantly in terms of demographically and economic profile.

In practice these previous process phases were grounded on the *evidence* documentation such as various demographic and other statistics. These documentations quantified the challenges relating to the demographic switch for the coming years and highlighted some demographic differences between the five different regional areas. As a result evidence grounded on the support of reliable documentation could be fulfilled. Moreover, in all more than 350 persons participated in our eight collaborative workshops and covered various actors and skills as required in a heterogeneity driven innovation process (Santonen and Saarela, 2013). The workshops were mostly based on small team collaboration even if some tasks were conducted individually during the workshop tasks. Thus, in our opinion these project phases can strongly be linked to the *interaction* and *expertise* requirements of the foresight process.

The detailed results and research methods relating to these processes have previously been documented in English by Meristö *et al.* (2012a) and Santonen *et al.* (2013). Moreover documentations in Finnish are also available by Meristö et al. (2012b) and Laitinen *et al.* (2013) for those who can read Finnish. The main outcome from this prior process was four future scenarios which a bit surprisingly did not have any significant differences in a regional vs. national level comparison. These scenarios were named as 1) Welfare and Security on Technology, 2) Rise of the Civic Society, 3) On the Markets' Terms and 4) Comprehensive Wellbeing.

Moreover, we identified following three generic skills and competence needs which could be linked to the all four scenarios: 1) technology, 2) business and 3) social skills. The importance and weight of these skills varied somewhat from one scenario to another. For example *welfare and security on technology* scenario would naturally highlight technology skills more than the other skills, *rise of the Civic Society* would emphasise social skills and *on the Markets' Terms* would stress business skills. However, it was argued that realization of the *comprehensive wellbeing* scenario would instead require improvement of all above skills. As a result, we argue that our four different scenarios should set somewhat diverse skills requirements for the future and consequential should stimulate diverse development ideas for education.

3.3 The demographic profile of the interviewees

The creativity in previous scenario definition phase was basically derived from the collaboration between workshop participants instead of purely from individual effort. This made the scenario phase more close to team creativity than individual creativity. In some cases team creativity could be explained by team member creativity, although it is not a simple and straightforward process (Pirola-Merlo and Mann, 2004).

Therefore, one can argue that the critical evaluation of our foresight research design calls a process phase where also inventiveness of individuals is stressed. Thus, a series of individual interviews (N=113) were conducted among diverse group of experienced practitioners. In the table 1 we have presented the distribution profile of the interviewed people. To ensure the participant heterogeneity as suggested by Santonen and Saarela

(2013), demographic profiles varied in terms of distribution between 1) wellbeing (66 %) vs. security (34 %) experts, 2) public (55%) vs. private (34 %) vs. NGO (12 %) experts and 3) large (54 %) vs. small (46 %) organization experts and finally 4) regional expertise (Southern Ostrobotnia 26 %, Uusimaa 26 %, Satakunta 22 %, Pirkanmaa 16 % and Varsinais-Suomi 11 %). As a result we argue that especially in terms of organizational heterogeneity, our sample is diverse and the data collection should lead to diverse set of ideas.

Table 1: Demographic profile of the interviewed people (N=113).

	Type			*Size*			
	Pubic	*Private*	*NGO*	*Large*	*Small*	*All (N)*	*All (%)*
Wellbeing (N)	50	15	10	38	37	75	
Wellbeing (%)	44 %	13 %	9 %	34 %	33 %	66 %	
Southern Ostrobothnia	13	3	4	10	10	20	18 %
Pirkanmaa	8	3	1	6	6	12	11 %
Satakunta	11	3	2	11	5	16	14 %
Uusimaa	12	6	2	5	15	20	18 %
Varsinais-Suomi	6		1	6	1	7	6 %
Security	12	23	3	23	15	38	
Security (%)	11 %	20 %	3 %	20 %	13 %	34 %	
Southern Ostrobothnia	3	6		6	3	9	8 %
Pirkanmaa	4	2		4	2	6	5 %
Satakunta	2	6	1	4	5	9	8 %
Uusimaa	1	7	1	5	4	9	8 %
Varsinais-Suomi	2	2	1	4	1	5	4 %
All (N)	62	38	13	61	52	113	
All (%)	55 %	34 %	12 %	54 %	46 %	100 %	

3.4 Idea generation and documentation process

During the interviews each of the four future scenarios were described to the interviewee. After this presentation interviewees were asked to generate novel ideas relating contexts and structures of wellbeing and/or security education, which are taking account the given scenario. Afterwards, the next scenario in varied order was presented in order to minimize data collection bias.

In all interviews (N=113) conducted by six different interviewers resulted 292 acceptable ideas (ca. 2.61 per interview), which were documented with the help of uniform idea format. The individual idea description included headline, short caption, answers to why, what, whom and when questions adapted from Five Ws concept as proposed by Santonen (2012). Thus, the length of the each idea descriptions varied somewhat between half to one page while having a simple content structured including headline, caption and body text. Additional classification information included content and target group related keywords and reference link to scenario and respondent profile.

As a result were able to link each idea description to the original contributor and the scenario which originated the idea. Moreover, three different classification variables were defined in order to help evaluating the radical vs. incremental nature of the proposed ideas. The defined variables were 1) *length of the education* ranging in five steps between few days to over year, 2) *the level of education* in four steps from vocational to university training and 3) degree education vs. further education as indicator of *education type.*

3.5 Data cleaning and preliminary classification process

Idea generation processes are typically known to produce duplicated ideas (i.e. multiple actors are suggesting the same or very similar idea). Therefore to reduce the useless repetition, all six interviewers combined similar ideas during their idea documentation process while adding appropriate classification information, thus not losing the valuable idea source information. Next a group of four researchers from core project group read individually all these ideas and collaboratively formed a classification schema, which included 32 subcategories. To ensure the usefulness and clarity of this classification schema, the documented ideas were individually classified by the same researcher group. In the next phase, the individual classifications made by single researchers were compared and all differences were discussed and clarified between researchers. Roughly only less than ten per cent of ideas were classified differently among researchers indicating relatively unambiguous classification schema. The number of idea per each subcategory distribution is presented in Figure 2.

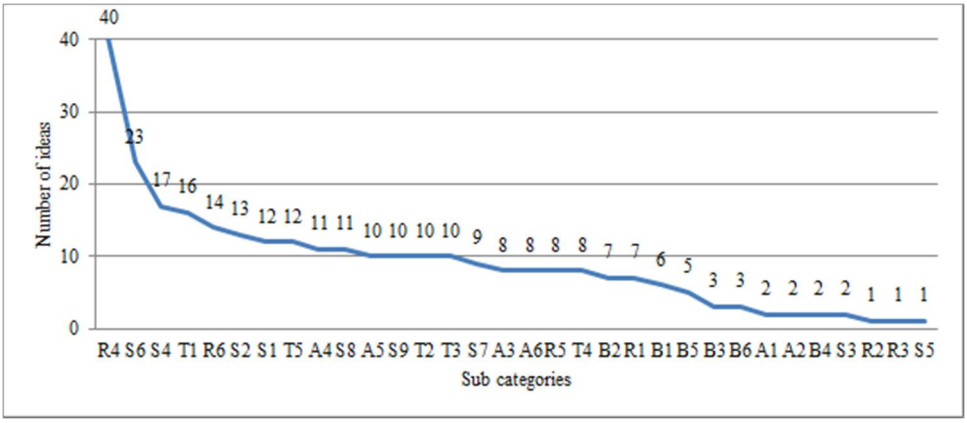

Figure 2 Number of ideas per each sub category

The first four subcategories included about one-third of all ideas, while the first eight subcategories (quarter of all categories) included over half of the all ideas. Even if the preliminary reduction of duplicated ideas had been previously conducted for the regional data, the idea distribution in Figure 2 is indicating somewhat concentrated idea set when the data from all regions was summarized. Therefore, in order to generate more holistic view from this freshly classified raw idea dataset, a second categorization round was conducted. The aim of this round was to further combine and possible re-group the idea list with the help of individual subclasses which as has been said included 32 subcategories.

The second round and the related group discussion process resulted the following seven main idea themes all having from 3 to 5 sub categories: 1) multi-cultural and language, 2) learning environments, 3) changing operational environment, 4) technological know-how, 5) multidisciplinary degrees, 6) interaction and communication and 7) courses. As a result in our opinion we had now manageable and understandable set of holistic idea themes, which could be used as a starting point for the following idea generation workshop.

3.6 Second idea generation process – utilizing team creativity

Since the previous interview-based data collection phase highlighted the aspect of individual creativity, the second iterative idea generation phase emphasised the creativity of pairs and teams. In all four regional workshops were held which engaged altogether 26 participants covering public, private and educational sector actors. First, all seven main idea themes including related subcategories were introduced to participants in order to offer and form an overall understanding of the proposed ideas. Then each of the seven themes followed the same 15 to 20 minutes collaborative idea generation process. In the beginning each workshop participant individually generated new viewpoints for the proposed themes. Hereafter own ideas were presented to a pair who also shared his/her ideas. Next new viewpoints were generated and documented in pairs while selecting the most important ones. Finally the pairs shared the viewpoints which they considered the most important with the other workshop participants. As a result of these efforts, we were able to collect and document 576 viewpoint relating to our preliminary idea themes.

3.7 Final classification process

By following similar data cleaning and analyse process as in the case of preliminary classification, a core project members evaluated all the second round viewpoints, while also testing the usefulness of preliminary classification. Minor changes were made in terms of naming the themes and the distribution of sub classes into main themes. The final set of idea themes and sub classes are described in the beginning of result section.

3.8 Educational expert's evaluation of the generated ideas

Once the final idea set was mortgaged as a result of several iterations rounds as discussed above, a group of educational experts (N=21) in four different regions were interviewed. During this process, the final set of idea themes and sub classes were presented to the interviewee. Then they were asked to evaluate the current status and future plans relating to the suggested ideas from their organization point of view. In all 704 comments relating to the presented ideas were documented, which were used as a tool to evaluate the distribution between racial vs. incremental idea. The classification of these individual comments followed the same structure as the preceded idea classification process.

4 Results

4.1 Defined idea themes

As a result the following seven themes and related subthemes regarding the development of wellbeing and security education could be derived.

Multi-cultural and language theme including following subtopics: 1) enhancing international exchange and visiting activities by increasing student and faculty exchange volume and encouragement, 2) cultural competence including both knowledge of a Finnish culture for foreigners and foreign cultures for Finns, 3) learning-by-doing and experimental learning with immigrants and 4) increasing profession and practical driven language teaching and paying attention to Russian alongside with now common English and Swedish.

Learning environments theme including following subtopics: 1) incorporating trainers outside educational institute such as seniors, alumni and expert by experience, 2) internships and other working life related exercises, 3) collaboration between educational institutes and 4) collaboration with other actors while ensuring multi actor and –disciplinary approach.

Changing operational environment theme including following subtopics:1) market orientation especially in terms efficiency and competitive bidding, 2) entrepreneurship and introduction of different forms of business, 3) customership and 4) service system and network management including supervision, metering and ethical issues.

Development and technological know-how theme including following subtopics: 1) development and innovation process, 2) utilization of technology and 3) technology environments as learning environments.

Multidisciplinary and life-long learning theme including following subtopics: 1) multi-disciplinary degrees, 2) further education including continuing education, specialization and management training, 3) personalized learning paths, 4) training for new professions.

Interaction and communication theme including following subtopics: 1) face-to-face and virtual communication skills (also for supporting workforce), 2) tolerance education and consideration other's feelings knowledge and 3) group leading and understanding the special characteristics of people with memory disorder, substance abuse and mental health problems.

Short term courses theme including following subtopics: 1) self-care and caregiving skills, 2) labour market training, 3) civics education and various citizen skills, 4) NGO training courses.

4.2 Heterogenic demographic profile as an idea source

In the following we will present a descriptive profile of the generated ideas. *Organization type:* Private sector actors (3.2 ideas per actor) were a bit more productive comparing public sector (2.9 ideas per actor) and NGO/third sector (2.5 ideas per actor). *Organization size*: The actors from large organizations were more productive (3.07 vs. 2.21 ideas) when comparing to the small organization actors. *Domain expertise*: Security domain experts were slightly more productive comparing their wellbeing counterparts (3.2 vs. 2.7 idea per interviewee). The more detailed descriptive profile relating to the main idea themes and their linkage to the interviewee profile in terms of 1) large vs.

small organization, 2) public sector vs. private sector vs. NGO, 3) wellbeing vs. security and 4) region comparison results are presented in Figures 3 to 6. At this point we would like to note that these illustrations are based on the percentage share of the absolute number of generated ideas. Thus the illustrations results do not weight or note the number and distribution of the interviewees.

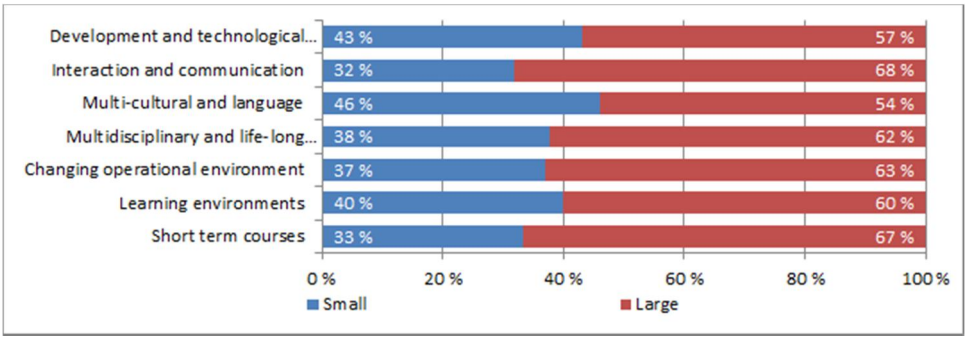

Figure 3 Comparison between small vs. large organization

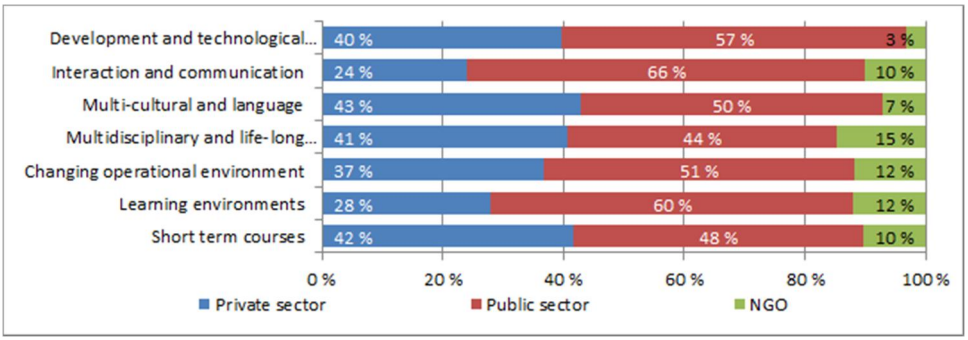

Figure 4 Comparison between private sector vs. public sector vs. NGO

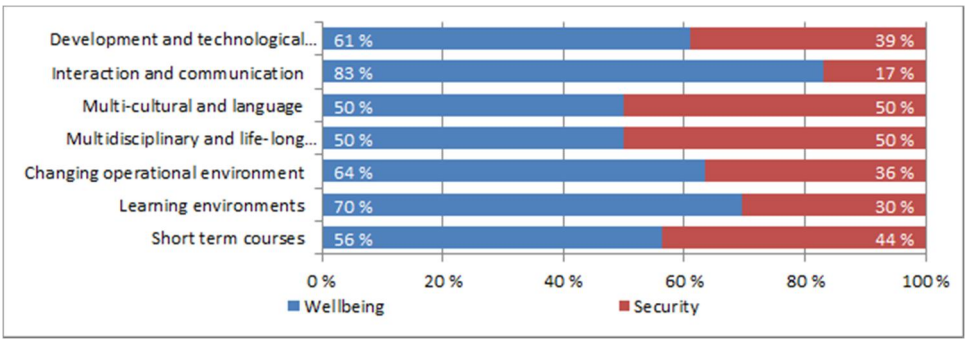

Figure 5 Comparison between wellbeing vs. security

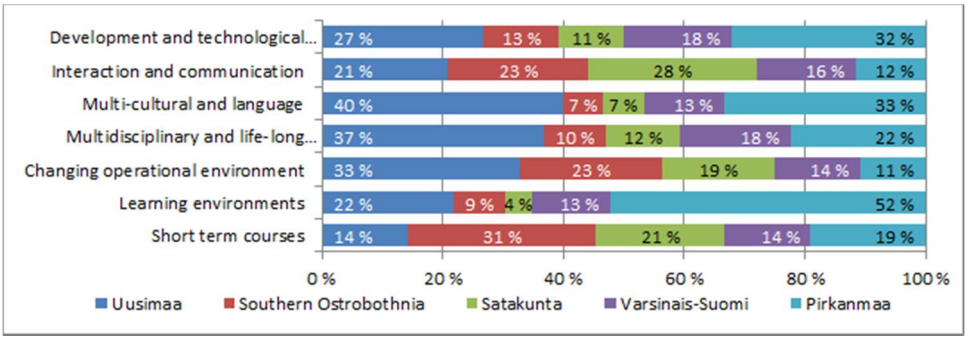

Figure 6 Comparison between regions

Based on the above figures the most substantial opinion differences were identified within following viewpoints. Comparison between wellbeing vs. security expert identified most significant difference relating interaction and communication ideas which was stressed among wellbeing experts (83 %) and resulting only minor interest among security experts (17 % of the ideas). It also appeared that small vs. large organization was not as an effective diversity source for idea generation since the distribution between main idea themes varied modest between 32 % to 46 % in the case of small organizations and between 54 % to 68 % for large organizations.

In the case of private vs. public vs. NGO comparison, NGO were least interested on *development and technological know-how* idea theme (3 % of the theme ideas) whereas especially large public sector organizations (66 %) were most strongly focusing on the *Interaction and communication* ideas. Also in the regional comparison few notable differences were identified. South Ostrobothnia and Satakunta regions were less interested (7 %) on multi-cultural and language ideas than more highly populated and international Uusimaa (40 %) and Pirkanmaa (33 %) regions. Interestingly Pirkanmaa region was also strongly stressing especially learning environment (52 %) related ideas. In the South Ostrobothnia there seem to be clear interest and need for short term courses (31 %). As a result of above illustration based analysis, we argue that participant heterogeneity especially in terms of region, industry and organization type is more likely leading to different educational ideas than organization size.

4.3 Evaluating future scenario effect as an idea stimuli

When the original ideas from the first interview round was analysed, it appeared that all our four different scenarios generated about the same amount of ideas (Scenario 1: 27 %, S2: 23 %, S3:21 %, S4: 29 % of all ideas). This was kind of expected since the presentation order of the scenarios was varied during the interviews. To verify the assumed differences between future scenarios as an idea source, seven main themes and four future scenarios cross-tabulation was conducted (see Figure 7).

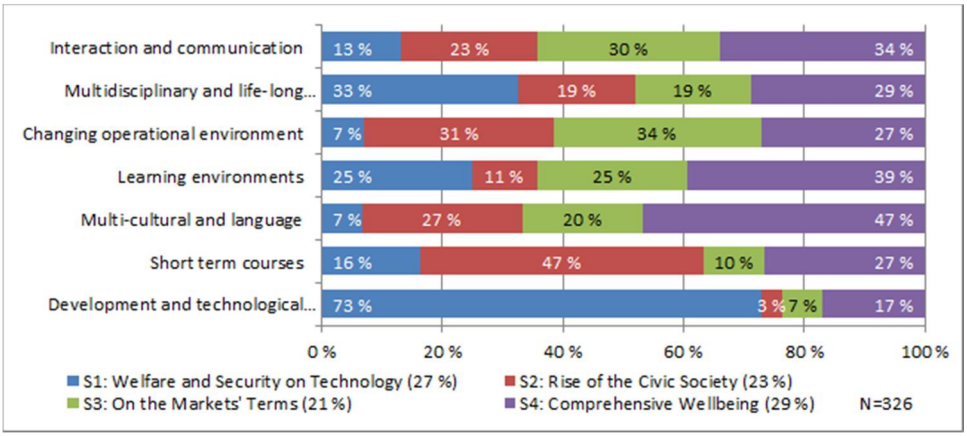

Figure 7 Main themes and future scenarios cross-tabulation

As a result it appeared that the distribution with in the each seven idea themes varied significantly. *S1 Welfare and security on technology* - scenario stimulated ideas especially relating to *development and technological know-how* (73 % of all ideas with in the theme), *S4 Comprehensive wellbeing* – scenario generating ideas focusing on the multi-cultural and language issues (47 % ideas with in the theme) and *S2 Rise of the civic society* - scenario generating ideas especially relating *short term courses* (47 % ideas with in the theme). On the contrary *S1 Welfare and security on technology* – scenario resulted only 7 % of the *multi-cultural and language* and *changing operational environment* ideas, *S2 Rise of the civic society* – scenario only 3 % and *S3 on the market's terms* – scenario 7 % of the *development and technological know-how* ideas. Thus, alternative scenarios as a stimuli material for education development gained support.

4.4 Evaluating the degree of idea radicalness

As a final step in our idea generation process, we interviewed a group of 21 educational managers who were responsible or leading the educational development within their own educational institute. In all we documented 704 comments relating to our seven main themes and the included subcategories. According to our results, in practice most of the suggested ideas were already being implemented, planned or at least discussed within the evaluated educational institutes. Therefore, the degree of idea radicalness in terms of novelty was tenuous at least at the system level (i.e. ideas were know at least among some actors and institutes). During the discussions with managers following reasons were provided as an explanation for this finding. Many of the participated practitioners who might be experts in their field, do not have up-to-date understanding of the on-going educational offering. Thus they could have been based their understanding and ideas on their own studies which might have been finished already a long time ago. This problem is also partially related to the long duration of the completing the studies which typically takes about 3.5 to 4 year for bachelor studies and even longer for master studies. Therefore, even if educational institute has already implemented (or planned) novel curriculum, the time-to-market for new students entering the job-market is long. Some of interviewees for example argued that they had in year 2012 started the new curriculum.

5 Conclusion

With the help of multi-phased foresight process in this study we identified seven future driven innovation themes relating to the contents and structures of wellbeing and security education. After defining alternative scenarios and engaging diverse group of industry experts via individual and team driven idea generation process the participant heterogeneity and alternative futures were somewhat fostering the diverse idea generation.

From the theoretical contribution point of view, we were able to verify the importance of the heterogeneous participant profile and source material relating to the future driven idea generation process. Thus, our findings support the existing body of knowledge, which emphasizes multi actor idea generation processes as noted many times in the existing body of knowledge. However, it also appeared that our approach which was strongly relying on the practitioners participation was leading more or less on incremental improvements to the existing educational offering instead of radical reform suggestions. Therefore, the private, public and NGO sector as stakeholders are not putting a serious pressure to the educational institutes to radically reinvent themselves, but instead of are more interested in minor incremental improvements which could be implemented relatively fast and easy comparing to possible radical counterparts. As a result we emphasise the deeper collaboration between educational institutes and practitioners on the daily basis in order to increase the understanding what is going on in the education sector. This collaboration should be actively used also to collect the incremental improvement ideas from practitioners, which educational institutes should implement right away in their processes. Educational institute driven bold experimentations are suggested as a tool to foster radical educational ideas instead of focusing on the practitioners suggestions.

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