Building a Measurement Tool for Entrepreneurship Education - a Participatory Development Approach

Abstract

The aim of this paper is to illustrate and model the construction of a Measurement Tool for Entrepreneurship Education where the tool itself is targeted toward Finnish teachers working in primary and secondary education. This study represents participatory action research (Argyris 1993) as the research context has been facilitated and provided by the researchers, and where the study objects initiate, respond, and develop their activities, thereby reforming the context further.

The presented case is an illustration of the building of a Measurement Tool for Entrepreneurship Education, prepared in an ESF-funded project. In this study we present multi-method, multi-investigator, multiple data, and multiple theory triangulation (Denzin 1988) settings. From the data, the phases of the measurement tool construction were identified.

Our aim is to present the process in order to link the theory and practice of entrepreneurship education. Here, a broad and multilayered definition of entrepreneurship education is utilized, and by making these aspects explicit the tool itself has a role not only as a teacher's self-evaluation kit but also as a steering system for developing schools and regions on a larger scale.

1. Introduction

Entrepreneurship and entrepreneurship education are being promoted in the European Union (Commission 2003; 2006) and various programs and strategies to support activities are being implemented on a national level. In Finland, the Ministry of Education and Culture[1] have created their own strategy for entrepreneurship education that contains specific methods for all levels of education. Additionally, the strategy includes a "projected state of affairs", which should be achieved by 2015. (Ministry of Education, 2009.)

Comprehensively, in Finland entrepreneurship education is currently focused on two important issues: the advancement of entrepreneurship and the development of education. In turn, entrepreneurship education aims to maintain and create enterprise in the future as well. This requires a functioning steering system. Further, entrepreneurship education is offered as a solution for issues facing educational facilities, such as pressures for change and teaching development, especially regarding the diversification of pedagogics, student assessment, and the enrichment of the educational environment. (See e.g. Ministry of Education, 2009.)

[1] Ministry of Education in year of 2009

The Measurement Tool for Entrepreneurship Education is a development and research project with two objectives. One goal is to develop a self-evaluation tool for primary and secondary level teachers in order to support the implementation of entrepreneurship education, thereby providing a pedagogical aid for the planning, assessment, and development of teaching. Another goal is to clarify as well as further develop the effectiveness of national entrepreneurship education support systems through the use of the measurement tool. To reach these two goals, interdisciplinary research has been required, and the project is based on research in various different disciplines. By combining business science, entrepreneurship research, entrepreneurship education, and pedagogics, we are able to examine the complex nature of entrepreneurship education in a broader and more analytical fashion and respond to the challenge presented by the development and research project. (Ruskovaara etc., 2009; 2010.)

The Measurement Tool for Entrepreneurship Education has been constructed in multiple stages between 2008 and 2011. The work continues and the current project is set to be completed during 2012. The development of the Measurement Tool will be continued after that in other national and international projects. The responsible actors behind the project are the Lappeenranta University of Technology in cooperation with a third sector organization active in teaching and education, the Centre for School Clubs (Kerhokeskus – koulutyön tuki ry). Additionally, 30 primary and secondary teachers have been recruited to the project, and they have been involved in the construction progress from the beginning. The Measurement Tool has been shaped by action research methods. The construction of the Measurement Tool has been guided by participatory action research, and case study; the collaboration and shared expertise of the users (teachers) and the designers (researchers) have been central to this project.

The Measurement Tool is unique because it is the world's first entrepreneurship education self-assessment tool developed for teachers. In this paper, we describe the development process, combining theory and practice, behind this user-oriented innovation.

Our paper is organized through the following structure: first, we will present the importance of entrepreneurship education concerning policies and the current aims of education. Second, we will highlight how the development of the Measurement Tool for Entrepreneurship Education is based on methodological choices. Third, we will present a theoretical and conceptual framework, on which we have based the construction of the Measurement Tool. Fourth, we will present the testing of the framework and the conclusions drawn. By way of illustration, we will also present the structuring of the questions in the Measurement Tool. Finally, we conclude our paper with a statement concerning that the implementation of the steering system requires the development of more systematic assessment tools. Additionally, we will reflect on how theoretical and conceptual frameworks might be improved, what might be new areas of research, what other target groups should be considered when developing assessment, and what development opportunities the Measurement Tool could provide for the European Union, for instance.

2. The construction of the Measurement Tool as an interdisciplinary study: methodological premises and reliability

Next, we will disclose the interdisciplinary premises associated with the development of the Measurement Tool. We will present the participatory development approach, our triangulation premise, and points of view regarding the reliability of our study.

2.1. Participatory development approach – action research and case study approach

Action research can be defined as an interactive inquiry process (Reason & Bradbury, 2008) and it is a twofold methodological approach that consists of two projects: the action project, where action or intervention is generated, and the research project that intends to create knowledge about that action (Coughlan & Coghlan, 2002; Reason & Bradbury, 2008). Considering the real-life setting in our case, the action research framework provided a methodological background for our study.

In terms of participatory research, action research forms a suitable basis for the development of an evaluation tool where the aim is to enhance the teacher's self-reflection and learning (see for example Cohen and Manion, 2007). As Kemmis and McTaggert (1988) argue, action research is a form of collective self-reflective enquiry undertaken by participants in order to improve the rationality and justice of their own social of educational practices, as well as to increase the understanding of these practices and the situations where these practices are carried out. Thus, teachers from comprehensive schools and vocational education took part of our development process. The teachers represent ten different municipalities and educational levels (elementary and upper levels of comprehensive school, upper secondary level, basic vocational training) and organisations, and come from different parts of Finland. The average age of the respondents is 40 years, and they have an average of 10-15 years of teaching experience.

Therefore, as a practical example, we had so-called brainstorming sessions which were organized according to the research questions of our project and which were based on Shulman's and Shulman's (2004) views of teachers' reflection processes in which vision, motivation, understanding, and practice play a significant role in their learning. The questions were, for instance:

1) How do teachers understand the concept of entrepreneurship education?
2) How do teachers understand its planning, realization, and evaluation?
3) How do teachers understand its learning environments and organizational cultures?

The qualitative data was collected from meetings with the researchers and the users, brainstorming sessions, and from individual tasks performed by the test teachers. The data was collected through individual essay writings and collaborative group work. The analysis of this data was mainly content and discourse analysis. In line with Argyris' (1993) views of participatory research, this study represents participatory action research as the research context has been facilitated and provided by the researchers, and where the study objects initiate, respond, and develop their activities, thereby reforming the context further entrepreneurship education.

Moreover, teachers participated in designing questions for the Measurement Tool and in giving feedback to questions designed by other participants. Teachers felt, in addition to that

they were “doing work for the Measurements Tool project”, that they were learners in the project. This statement also goes for the “real researchers” of the project. The action research as a whole built up our understanding of the phenomenon in terms of entrepreneurship education. These aspects are considered further in the discussion part of our paper.

Within the action research setting, we apply the case study methodology to report the studied development process. Yin (2009) defines a case study to be an empirical inquiry that investigates a phenomenon within its real-life context. The main reason for using the case study approach is the desire to understand particular complex phenomena either by learning something about the particular case itself, or by using the case to accomplish a more general understanding (Stake, 1995; Yin, 2009). Within management studies, the case study approach has traditionally been used, especially when there has been a need for new theory development (see e.g. Eisenhardt, 1989). These initial steps will be further demonstrated in our paper. This concerns, for example, the creation of a theoretical and conceptual framework. Next, we will focus more deeply on the validity and reliability of our work.

2.2. Triangulation as an approach for building the validity of the process

In this study we present multi-method, multi-investigator, multiple data and multiple theory triangulation settings (see for example Denzin, 1988). In line, Cohen and Manion (2007) stress how multiple methods, or the multi-method approach as it is sometimes called, contrasts with the single-method approach that characterizes a lot of research in the social sciences. Therefore, we may see, having many researchers and participants in building up the reality from the data, collecting various, multiple data and having several theoretical and conceptual approaches (like we will present in the chapter “Building up a theoretical and conceptual framework”) grounds our understanding of entrepreneurship education and its evaluation and will give us some basis of validity.

2.3. Developing a reliable assessment tool

According to Downing (2009) we built up our tool in terms of effective test assessment: These features are:

- Overall plan
- Content Definition
- Operationalization of contents
- Test design and assembly
- Test production (current stage)
- The production of the final tool/test
- Test administration
- Scoring examination responses
- Establishing passing scores
- Reporting examination results
- Item banking
- Test technical report

Moreover, we followed Metsämuuronen´s (2005) ideas in test development:

- Asking/finding the right question

- Finding/developing a theory
- Composing preliminary components and constructing the instrument
- Critical examination of components
- Pilot study
- Examination of components' value and parameters
- Final version of tool

At this stage we are operating with the final version of the tool. Measurement Tool management, processing of the answers, the output of reports, and storage of the answers are issues we are currently working on. Additionally, we are working on a suitable response system for the participant.

We will now describe the factors upon which the construction of the Measurement Tool has been based. First, we will present our theoretical and conceptual premises as well as the framework developed from them. We will then highlight how we have tested the framework and what observations we have made based on the results and on literature. Because our paper is based on many different studies that have been conducted during our project, we will make references to some of several papers and articles about research results from which the reader can find more information about the research content and the development of the Measurement Tool.

3. The preparation of a theoretical and conceptual framework and its operationalization

In this section we present the theoretical and conceptual framework used in our project as well as the criteria for its preparation. Additionally, we will present the findings discovered when testing it. Finally, we will present the foundations on which the Measurement Tool questions were created and how the operationalization of the questions was carried out in practice.

3.1. Administrative documents, practical, theoretical, and scientific grounds for framework development

The entrepreneurship education guidelines of the European Union (2003; 2006) are also implemented on national levels. In Finland, entrepreneurship education has been a part of the curriculum for a long time (included in primary education curricula since 1994), and in 2009 a specific strategy was drawn up for entrepreneurship education. In the curriculum, entrepreneurship education is as a whole seen as a cross-curricular theme and generally present in the provision of educational and vocational guidance section of curricula. The foundations of the curricula define the content and learning goals of entrepreneurship education, and they have been specified according to educational level in the strategy drawn up in 2009. (Finnish National Board of Education, 2003; 2004; Ministry of Education, 2009.)

Entrepreneurship research has a long tradition in business administration both within leadership and organizational research. The research of entrepreneurship education from an educational perspective has grown during the beginning of the 21st century, and studies concerning learning are on the upswing. The pedagogical aspects of entrepreneurship

education are also popular research topics. When developing the theoretic framework of the Measurement Tool for Entrepreneurship Education, we wanted to make use of existing research, both within business administration and pedagogy, as well as utilize the available strategies and curricula on a national and an international level. We constructed the consensus and concepts for our interdisciplinary research group in the autumn of 2008. Entrepreneurship, entrepreneurship education, teaching, and learning became central concepts.

Certain principles guided the formation of the theoretic framework. We divide the hermeneutic and the communicative educational concepts: on one hand, the educator has an obligation to support and steer the learning process; on the other hand, the relationship between the educator and the student is understood as being one of equal value, based on reciprocity and dialogue. (e.g., Siljander, 2002.) Our concept of education is socio-constructive and sociocultural, which also goes for entrepreneurship education. Learning is a cultural, contextual, active, goal-oriented, and social process. Knowledge is compounded individually and combined with previously gathered knowledge. Learning is not tied to a specific place or time. (e.g., Säljö, 2001.)

It is necessary to understand the concept of entrepreneurship in order to define *entrepreneurship education.* So far, there is no consensus suggesting a single, comprehensive theory of entrepreneurship (e.g., Shane and Venkataraman, 2000), and there are many different approaches to conducting research on the subject (e.g., Grebel etc., 2003; Grant and Perren, 2002).

The various definitions could be summarised in the following five perspectives: 1) *bearing uncertainty* (Drucker, 1985), according to which the entrepreneur tries to strike a balance between market demand and supply; 2) *making new combinations* and *innovations* such as new products, production methods, markets, and organisational forms (Schumpeter, 1934); 3) *exploring opportunities* (e.g., Kirzner, 1973; Shane and Venkataraman, 2000); 4) *the emergence and creation of organisations,* which is a combination of definitions put forward by many researchers (Pinchot, 1985; Gartner, 1988); and 5) *community and social entrepreneurship* (Johannisson and Nilsson, 1989).

Terms such as enterprising and entrepreneurial are used to define entrepreneurship education. The only major distinction between them is that entrepreneurial traditionally refers to business activity, whereas enterprising can be used in any context (e.g., Gibb, 2005). According to Kyrö (1997), entrepreneurship education deals with three main components: 1) self-oriented, 2) internal and 3) external entrepreneurship. In order to avoid confusion and in the interest of clarity, in this article entrepreneurial refers to the business context and enterprising to general education and learning processes. Entrepreneurship education is thus seen in terms of three aims: learning to understand entrepreneurship, learning to become entrepreneurial, and learning to become an entrepreneur (e.g., Hytti, 2002). As Gibb (2001, 2005) has stated, entrepreneurship education is about learning for entrepreneurship, learning about entrepreneurship and learning through entrepreneurship. It should therefore be considered both as a method and as learning content (see Remes, 2003), and teachers play a central role in its realisation (Seikkula-Leino, 2008; Sobell and King, 2008). The concepts used in this paper are internal entrepreneurship, which concerns entrepreneurial and enterprising behaviour, and external entrepreneurship, which is about doing business (Ristimäki, 2003). Moreover, internal entrepreneurship in education is about learning to

become entrepreneurial, whereas external entrepreneurship relates to understanding entrepreneurship and becoming an entrepreneur.

We initiated the construction of a theoretical framework using the five aforementioned theories of entrepreneurship and the internal and external concepts of entrepreneurship education. To enforce internal entrepreneurship we will also include Borba's (1989) self-confidence theory, and we approach learning using experimental learning (Kolb, 1984). Teaching and the development of teaching was significant not only for the construction of the measurement tool, but also for of its practical uses. We understand that the development of a teacher's own work happens specifically through the learning process, where we adjust the self-reflective model of Shulman & Shulman. Additionally, a cornerstone of the whole model was Novak's and Govin's (1984) "meaningful learning" concept. This is also a guiding factor in experimental learning.

Research in entrepreneurship education that would have been focused on primary and secondary education and specifically on the teachers' opinions and their realization of entrepreneurship education was not widespread at the beginning of the research project. The research group behind the Measurement Tool for Entrepreneurship Education set off with the results achieved by Seikkula-Leino's (2006; 2007) studies: entrepreneurship education was a concept that, despite its importance in education, was difficult to grasp. It was a challenge for teachers to locate subject matter and methods of teaching entrepreneurship education.

The following table shows the premises of our research, associated with the socio-constructive and sociocultural concepts of education, meaningful learning as well as experimental learning, the relevance of the teacher as student, and research of entrepreneurship education as well as entrepreneurship. Underlying the construction of the measurement tool are also the elements of our support systems, such as curricula and strategies. Furthermore, the development of our Measurement Tool has been guided specifically by primary and secondary school educational goals. In all, we have modified the assessment system for entrepreneurship education; that is, the teachers' self-assessment tool for entrepreneurship education.

Meaningful education and teaching (based on socio-constructivist and sociocultural educational concepts)	*The teacher as implementer of education and teaching*	*Entrepreneurship education: what is it and what should it be?*
Novak & Govin (1984): "meaningful learning" • Goals • Contents • Work methods • Learning environment • Business culture • Assessment • Goals Additionally Kolb 1984 (experimental	Curriculum research that present the teacher as learner Shulman & Shulman (2004): emphasis on teacher's self-reflection	*Entrepreneurship education:* Gibb (2001; 2005): learning through/for/about entrepreneurship Hytti (2002): learning to understand entrepreneurship, learning to become entrepreneurial, learning to become an entrepreneur

<table>
<tr><td>learning)</td><td></td><td>Kyrö (1997):

self-oriented, internal and external entrepreneurship

Borba (1989) - internal entrepreneurship

Entrepreneurship:

• bearing uncertainty (Drucker, 1985)
• making new combinations (Schumpeter, 1934)
• exploring opportunities (e.g. Kirzner, 1973; Shane and Venkataraman, 2000)
• emergence and creation of organization (Pinchot, 1985; Gartner, 1988)
• community and social entrepreneurship (Johannisson and Nilsson, 1989)</td></tr>
<tr><td colspan="3">Management systems (political and administrative documents: EU, Finland, curricula)
→</td></tr>
<tr><td colspan="3">Primary and secondary education points of view
→</td></tr>
<tr><td colspan="3">Assessment system, in this case, the development of the measurement tool
→</td></tr>
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Table 1: The conceptual and theoretical framework for the formation of the Measurement Tool for Entrepreneurship Education.

3.2. Testing of the theoretical and conceptual framework

In autumn of 2008, the test teachers received a preliminary task consisting of an e-mail questionnaire regarding the goals, implementation, and results of entrepreneurship education as well as the position entrepreneurship education had in curricula and strategies. During the first meeting between the researchers and the test teachers, a brainstorming session around the concept "what is meaningful entrepreneurship education" in the autumn of 2008, the teachers produced individual essays which were completed during a brainstorm session.

The data produced by the teachers was compared to the table presented above, thereby also attempting to find synthesis with entrepreneurship, entrepreneurship education research, paradigms, and various theories. Also the data showed that certain terminology was common: entrepreneurship education was understood as being comprised of internal and external entrepreneurship, entrepreneurialism and learner-oriented operation, were understood as comprising the content and method of teaching. (Ikävalko etc. 2009; Mattila etc. 2009; Seikkula-Leino etc. 2009.) As Seikkula-Leino (2006; 2007) pointed out, it is difficult for teachers to define the goals and results of entrepreneurship education without getting them confused with each other.

Assessment was also considered to be a challenge. The data provided by the test teachers showed that the realization of entrepreneurship education was not a targeted activity. When we analyzed the data using Shulman's & Shulman's (2004) model of teacher self-reflection, we discovered that, although the teachers were quite motivated to develop entrepreneurship education, they lacked a clear vision and understanding of entrepreneurship education. If these components of the teacher's actions are missing, the model does not work in all directions, nor can the self-reflection necessary for the development of teaching be achieved. Analysis also showed that entrepreneurship education is realized through various projects and separate events not tied to the teacher's everyday teaching methods or to activities within the school community. Because of this, the significance of entrepreneurship education as an active cultural element remained unrealized. (Seikkula-Leino etc., 2009; Seikkula-Leino etc., 2010; Ruskovaara etc., 2011.)

The preliminary material of the test teachers resulted in significant data regarding the relevance of terminology and concepts used in teaching entrepreneurship education. Entrepreneurship education combined the following pedagogical discussion topics: activation of teaching methods, the participation of the learner, support of responsibility and activity as well as development of self-esteem and motivation, versatile learning environments, collaboration partners and networks near the school, multi-professionalism, collaboration between teachers, the teacher's role as a leader and an enabler, and an open business culture. The material showed that entrepreneurship education has a place in teaching and school pedagogy (Seikkula-Leino etc., 2010; Ruskovaara etc., 2011).

We also collected material regarding the suitability of different entrepreneurship theories in teaching and the school environment. This collection took place during the spring of 2009 at the second brainstorming session involving the researchers and the test teachers. The results showed that the teachers accepted the entrepreneurship and entrepreneurship education theories chosen by the researchers as well as the attributes of entrepreneurship such as risk-taking, innovation, thinking outside the box, and so on. Additionally, the teachers emphasized the importance of accountability and community.

The significance of the assessment system is also clearly highlighted in the steering system. We can deduce that the Measurement Tool will enable us to structure the work that needs to be done in the field and to mirror through the material how the goals are being attained in the education policy system. Through this type of process, we can also get feedback regarding the realization of the goals in practice.

In summary, we can state that Table 1 has been a necessary basis for the construction of the Measurement Tool. In it, we have collected the most relevant premises to keep in mind when planning the development of entrepreneurship education assessment for teachers. The research material showed that specifically the self-reflection of the teacher is underscored (Seikkula-Leino etc., 2010; Ruskovaara etc., 2011). Therefore, especially this guided our work building up the real questions of the assessment tool.

3.3. Operationalization of research data, theory, and concepts into measurable questions

The operationalization of theories and concepts into measurable questions was undertaken, in simplified form, through the following steps. The researchers had formulated questions in the summer of 2009, and during the third brainstorming session between the researchers and the test teachers, the testers created questions (and answer options) individually as well as in groups, from which common syntheses were made at the end of the day. The researchers combined all the questions that had been developed up to that point (300 questions) and they were then classified into predetermined concepts, overlapping questions were eliminated, and material was removed so that 191 questions remained. After this, the test teachers went through the first questions of the Measurement Tool (word strips) and commented on the rationality, intelligibility, and functionality of the answer choices, as well as on the appropriateness and coverage of the concepts (is something missing, is something excessively emphasized). At this stage, other experts were also used (steering group, colleagues). Based on the feedback provided, corrective measures were taken and the next version of the questions went through another round of comments. Based on this feedback, further corrective measures were taken.

The test version was coded into the database along with a first version of the background variables. The database, containing 191 questions, was opened to the test users in the spring of 2010. The test users responded to the Measurement Tool in three different pilot groups so that the feedback from the first pilot group was used to modify the tool for the second pilot group (writing errors, technical performance, overlaps) and in the same way the second pilot group's feedback was used to modify the tool for the third group. After the test rounds in the spring of 2010, a fourth brainstorming session for the researchers and the test teachers was arranged, and the first testing round was analyzed by the group.

The measurement tool was piloted by 28 test teachers in the spring of 2010. The tests showed that the technical solutions worked well. Based on the feedback and statistical analysis it became evident that the questions are intelligible and can be answered. The data was analyzed using the SPSS statistical program, although the small amount of data available limited the extent of the statistical analysis. The reliability and validity of the Measurement Tool was tested using frequency analysis. The spread of the answers showed that the questions are measurable. (Ruskovaara etc., 2010.)

Based on the feedback from the test teachers as well as on indicative statistical runs and on preliminary results, questions were eliminated, new ones were created to replace them, and the development of the questions continued during the summer of 2010. The edited set of questions (119 questions) was launched in the autumn of 2010 and the new test was staggered so that in addition to the test teachers, new teachers, so-called cross-test teachers, were recruited to the testing work. The feedback was collected in the same way as it had been the previous spring. In all, 54 teachers participated in the autumn test. After the autumn test, the test teachers received a separate questionnaire, a self-reflection task, about the construction process of the Measurement Tool as well as about views on the functionality of the tool. The analysis of these results is still in progress, but the preliminary results show that the tool is perceived as being meaningful and supportive of personal development.

In the winter of 2011, 113 new cross-test teachers joined the Measurement Tool test, which enabled more in-depth analysis of the reliability of the tool. By summer 2011, there were 212 participants. Based on the analysis, some of the questions were removed, some were combined, and some of the answer options were changed. The order of the questions was also changed. The functionality of the database and of the correct coding and saving of the

responses were cross-checked. Then the responses' descriptive statistics, means, variances, and frequencies were checked, and factor analysis and reliability analysis were used.

The measurement tool contains 113 questions at this time, which have been constructed around concepts drawn from a theoretical framework. The questions in the Measurement Tool were constructed from selected themes, classifications, and expert consultations as follows:

A broad set of questions was processed around new/selected concepts

a. Entrepreneurship education actions
b. Methods, work habits, other pedagogical solutions
c. Network cooperation
d. Learning environment
e. Activity culture
f. Strategies, curricula
g. Taking entrepreneurship education into practice

Classification: how many questions for the same concept, the origin of the questions; what is measured by the concept/concepts

h. The sum of the variables
i. Translated questions
j. Cause and effect questions
k. Likert-scale, yes/no options, quantitative options, open options

Expert consultations (testers, steering group, colleagues, the research team)

l. Intelligibility of questions, measurability, wording, clarity, grammar, overlapping questions

Responding to the Measurement Tool

m. Username and password
n. Signing in to the system
o. The right questions for the right profile (primary school, secondary school, rector)
p. Data is saved to the database
q. The answers are coded according to the questions on a 0-1 or a 0-1-2-3-4 scale or a 0-30 range
r. During the first rounds (test teachers and cross-testers) the users provide feedback regarding the answering experience (how did it feel, how long did it take, what worked, what didn't, is a specific theme emphasized, or should something be added)
s. Corrective measures => the measurement tool is still evolving

3.4. Example of the construction of measurement tool questions

Next, we will provide an example by describing the construction of the questions for the theme "entrepreneurship education actions", their refining process, and the significance of the feedback. All the questions within this are documented in appendix 1.

The questions within this theme were 33 in all, at the beginning. They were formulated from both entrepreneurship theories approved by the test as well as from entrepreneurship education teaching content brought up by the material produced by the test teachers (Ikävalko

etc. 2009; Mattila etc. 2009; Seikkula-Leino etc. 2009), as had appeared in previous studies (e.g. Seikkula-Leino 2007). The response alternatives for the concept questions were quantitative (0-30 or more).

The questions were tested in different test rounds between spring 2010 and winter 2011. Based on the feedback from the testers and on statistical analysis, 5 questions were removed from the theme, 5 questions were combined, and 3 questions were added. In the spring of 2011, the theme had 25 questions in all. Factor analysis divided the theme into five sub-themes, from which five sum variables were formed (the sum variables did not include questions which did not appear to everyone; these questions are number 38 and 41):

d. guidance and discussion: questions 21, 25, 26, 27, 28, 29, 30
e. entrepreneurship education activities enabled by the teacher, activating the students: questions 31, 32, 34, 40
f. teaching material, contests, and games: questions 15, 17, 18, 19, 20
g. entrepreneurship as educational content: questions 35, 36, 37, 39
h. entrepreneurs present: questions 22, 23, 24

The following table is put together of the sum variables derived from the theme ”Entrepreneurship education activities” as well as from their range, mean, deviation, and variance.

		material	activation	ediscussion	econtent	epresent
N	Valid	148	148	148	148	148
	Missing	0	0	0	0	0
Mean		4,1973	2,4848	8,3485	3,1605	2,7252
Std. Error of Mean		,44512	,35338	,65841	,49221	,40723
Median		2,0000	1,0000	5,7143	,5000	,6667
Mode		,00	,00	1,14	,00	,00
Std. Deviation		5,41512	4,29901	8,00991	5,98801	4,95417
Variance		29,324	18,481	64,159	35,856	24,544
Minimum		,00	,00	,00	,00	,00
Maximum		28,00	25,00	28,57	30,00	30,00
Percentiles	25	,6000	,0000	1,7143	,0000	,0000
	50	2,0000	1,0000	5,7143	,5000	,6667
	75	6,1500	2,5000	13,0714	3,0000	3,0000

Table 2: The sum variables and range, mean, deviation and variance from the theme “Entrepreneurship education activities”

Above, we described the functionality and reliability of the questions within one theme of the Measurement Tool, “Entrepreneurship education activities”. The same procedures were undertaken for the other themes as well.

3.5. Future steps of the Measurement Tool in 2011

During the winter tests, a response system was constructed in the Measurement Tool which, instead of testing content, tested technical properties for future development. The tests showed that the technical properties of the response system were functional. The number of responders enabled the development of the content of the response system. The test teachers commented on the response system in the spring of 2011. The analysis of these results is still in progress. The work continues, and the focus for this autumn's brainstorming session is precisely the development of response.

The purpose of the Measurement Tool is to give the user an instant assessment of the responses, which are constructed of four different profiles: developing, average, above average, and excellent. The construction of the response system is not yet complete, but is guided by the following principles:

Valuation of answers in the response profiles:

- limits, alternatives
    - define limits
    - pilot material determines (e.g. quartiles)
- average for sum variables, spread, etc., and a four-part division (developing, average, above average, excellent)
- the idea is four-stage thinking (see previous and next)

Response text structure

- 4 alternative answers / sub-theme: developing, average, above average, excellent
- Writing of response text:
    - 5 themes in all (see section c), with 12 sub-themes (for each of which there are 4 alternative texts)
    - different profiles (primary education, secondary education, rectors) receive different response texts (constructed by different limits, if the content is different for different profiles)

Response appearance

- numerical comparison, average comparison, diagrams, pie charts, etc.
- text sections are encouraging and supportive of progress, contain various links to resources for developing know-how
- response per e-mail containing a link to the graphs

The next steps for development are the development of different user profiles (specific questions clarified for specific user groups) as well as the development of the response texts according to the user profiles. The visual aspect of the Measurement Tool and of the response to the user is also under development. The research and development of content and technical aspects continue, and the Measurement Tool will be launched in the autumn of 2011 on a national level for use by primary and secondary school teachers.

4. Discussion

If entrepreneurship education is to be a target implementation in the educational system, more attention must be paid to how the meeting of the goals can be assessed. This is why we

have wanted to respond to this challenge with our project. What is entrepreneurship education to a teacher, and how should it be implemented? How do we, based on this, create a real tool for the teacher to guide the teacher's own progress? In order for international and national strategies to be realized, we also need up-to-date information regarding what is happening in education. The Measurement Tool provides support not only for the development of the individual, but also for the entire educational system, and on a broader scale, for the development of society itself.

In this article, we have described the construction process of the Measurement Tool for Entrepreneurship Education. As we have showed, the development of the Measurement Tool has been realized through participatory action research and case study. Central to this project has been to construct a user-oriented tool, and appropriately the collaboration and shared expertise of the users (teachers) and the designers (researchers) has been crucial in the construction phases. The test teachers have provided material throughout the entire project and the shared expertise has been utilized during the brainstorming sessions between the test teachers and the researchers. In this way, we have been able to combine theory and practice and create a deeper understanding of the phenomenon of entrepreneurship education and its assessment.

Although we have emphasized the importance of the reliability of the Measurement Tool in our project, this also has its limitations, as is always an issue with quantitative tests. However, we believe that by choosing the participatory action research method we have managed to delve deeper into the research issues, effectively responding to the challenges posed by quantitative research. We have very thoroughly opened up the development of entrepreneurship education assessment, and we can see that this information will be used to develop the best assessment system possible. Additionally, the work that has been done can be utilized in the development of assessment tools for other user groups, such as entrepreneurs and students.

In our research, we have introduced a theoretical and conceptual framework for entrepreneurship education. Our point of view is based on the development of the teacher. The framework could be further developed so that new elements can be added to the framework through further research. Also, the implementation of our Measurement Tool will provide an opportunity for the collection of a broad range of quantitative data in the future. Based on this, new conclusions for the functionality of our theoretical framework can be drawn. This Measurement Tool emphasizes Shulman's & Shulman's (2004) views on teacher learning, for example. What other themes could be manifested from the framework in the future, such as different dimensions of entrepreneurship and entrepreneurship education? When the measurement tool is activated, how will the teachers' learning process progress? Which areas will improve? Which areas will leave something to be desired? In order to update the Measurement Tool, it is important that we collect a broad spectrum of data from the results. This will also provide groundbreaking information regarding how the concepts of entrepreneurship education, such as internal and external entrepreneurship, the different aspects of entrepreneurship, methods of entrepreneurship education, learning environments and activity culture, network collaboration etc. are evolving in Finland.

Additionally we are also taking steps toward developing an international Measurement Tool. Although cultural differences themselves present a challenge, this project already enables us to open an international discussion about entrepreneurship education. How do

teachers in different countries realize entrepreneurship education? Are the challenges similar or are they extremely different? This will certainly provide a new perspective for the development of the European Union's educational steering system. This type of work could provide a stronger foundation for the realization of European entrepreneurship education. Only through assessment can we change practice. Only through assessment can you find the things which you want to focus on changing. You get what you measure!

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Appendix 1. The questions about “Entrepreneurship education actions".

“During the last six months, how many times have you …”

Question number 15: enabled entrepreneurship essays, writings, interviews, mathematic problems etc.

Question number 17: used entrepreneurship stories as teaching material

Question number 18: used materials about entrepreneurship as *supplementary* teaching material

Question number 19: used entrepreneurship games

Question number 20: taking part in (with the student) an entrepreneurial competition

Question number 21: promoted local entrepreneurship in the teaching

Question number 22: used entrepreneurs in the teaching

Question number 23: had study visits to companies

Question number 24: organized a visitor from a company

Question number 25: guided students to utilize various specialists

Question number 26: discussed (with students) about entrepreneurship connected to subject

Question number 27: discussed (with students) about entrepreneurship connected to hobbies

Question number 28: discussed (with students) about topical economic news

Question number 29: discussed (with students) about economic effects by different operations

Question number 30: guided students how to manage their money

Question number 31: organized a voluntary work project with students

Question number 32: enabled students to organize a bring-and-buy sale etc.

Question number 34: guided (or taken part in) a project where students have created an exhibition, newspaper, book, video etc.

Question number 35: enabled an entrepreneurship project

Question number 36: had students make a business plan

Question number 37: enabled students to create marketing etc. material for companies

Question number 39: enabled students to create their own company or own practice company

Question number 40: organized an entity connected with entrepreneurship

(The items freely translated from Finnish)