

## ASSESSMENT OF THE SUB-COMPETENCES OF ENTREPRENEURIAL COMPETENCE IN THE BASIC SCHOOL

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### Abstract

Age-appropriate entrepreneurial competence increases the well-being of the individual and society because diverse abilities and competences must be applied in entrepreneurship. Entrepreneurship is defined through the entrepreneurial process, which begins with the recognition and action of an entrepreneurial opportunity and ends with the implementation of a new idea. In the development of entrepreneurship competence, the assessment of the development of cognitive and social skills is difficult and novel in the field due to the abundance of entrepreneurship sub-competences and their different starting points. The purpose of the study is to create and validate a test to assess the knowledge and attitudes of basic school students about entrepreneurship. 19 Estonian basic schools of different locations and sizes participated in the test. The test was taken by 616 students who were divided into 3rd grade (N=326) and 6th grade (N=290) students. The test contains special types of tasks, e.g., multiple-choice tasks, each answer of which provides information about the learner's knowledge or attitude about at least one entrepreneurial sub-competency. There were three tasks in the test to measure each sub-competency. The tasks (N=34) were divided into multiple-choice situational tasks and self-directed tasks. The entrepreneurial sub-competences were: (1) self-efficacy, (2) motivation and risk-taking, (3) economic and financial literacy, (4) planning and management skills, (5) sustainable thinking, (6) community initiative, (7) environmental awareness and ethical thinking, (8) teamwork, (9) valuing ideas and opportunities, (10) vision and creativity. As a result, the tasks measuring sub-competences were divided into three categories: ideas and opportunities, resources and into action. As the main results of the study, the responses of the 3rd and 6th grade students differed, and it was found that the 3rd grade students achieved the best results on the tasks categorized according to the self-efficacy dimension and the lowest results in tasks measuring economic mindset competences. In contrast, 6th graders achieved the best results in tasks assessing ideas and opportunities and the worst results resources mobilization in tasks. As a result of the study, a test was prepared and validated, which enables the evaluation of sub-competences in entrepreneurship. As a result of the purposeful assessment of the sub-competences of entrepreneurial competence, there is an opportunity to develop entrepreneurial competence in the 3rd and 6th grades.

**Keywords:** *Entrepreneurial competence, assessment, cognitive, social, basic school.*

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### 1. Introduction

People with entrepreneurial competence are needed both in business and for the development of the well-being of society (Fayolle and Linan, 2014). In the field of entrepreneurship, a person can use his various abilities and sub-competences, thereby supporting the growth and well-being of personal development (Wiklund, 2019). Entrepreneurship is defined through the entrepreneurial process where sub-competencies of entrepreneurial competence manifest themselves from noticing an entrepreneurial opportunity to implementing a new idea (Shane, 2012, Mets et al., 2022). Different authors agree that cognitive and social skills developed in basic school age (Bandura, 1986, Ryan & Deci, 2000) promote the development of entrepreneurial competence sub-competences (Bacigalupo et al., 2016, Saptono et al., 2021). Among the sub-competences of entrepreneurial competence, economic and financial literacy is based on economics, which Albert Marshall defines as "the study of man in the ordinary activities of life". Therefore, the approach to entrepreneurial competence is based on an economic mindset, where most of us want to change the world, but to change the world, it is important to first understand it.

Previous empirical studies partially highlight the sub-competences of entrepreneurial competences that develop in a child's cognitive and social development, which, based on social cognitive theory, focus on self-determination, self-efficacy and social skills (Bandura, 1960), Profit theory economic and entrepreneurial process thinking (Knight, 1921, Shane&Venkataraman, 2000 ) and creative problem solving (Osborn&Parens, 1953) and creativity theory (Amabile, 1983) dimensions (Montroy et al, 2016, Ndou et al., 2018, Silveyra et al., 2021). For example, studies of entrepreneurship competence show that sub-competences based on the entrepreneurial process are assessed in general terms or only in terms of some sub-competences, for example, the development of teamwork and cooperation skills during participation in projects. However, when assessing entrepreneurial competence, it is necessary to distinguish sub-competences from which to base the development of entrepreneurial competence in basic school (Saptono et al, 2021). It has been pointed out as a problem that the assessment of the various sub-competences needed in the entrepreneurial process is difficult (Fayolle&Linan, 2014, Mets et al., 2022), because there is no clarity regarding the sub-competences of entrepreneurial competence that develop according to age and their assessment tools. Tests are used to assess the development of students' sub-competences in the learning process (Vestheim&Lyngsnes, 2016).

## **2. Sub-competences of entrepreneurial competence in basic school**

Entrepreneurial competence is related to the wider cultural, social, political, and economic situation of society (Keane et al, 2016). Entrepreneurial competence in basic school is defined as a learning process in which different sub-competences of entrepreneurial competence are supported (Montroy et al, 2016). For example, the ability to find opportunities and ideas that create value for others. The value created in the entrepreneurial process can be financial, cultural, or social, which is supported by the development of entrepreneurial competence and the formation of an entrepreneurial attitude in basic school. Attitude is understood as a comprehensive competence that includes sub-competences of entrepreneurial competence, such as creativity, communal or social will (Tiemensma&Rasmussen, 2019).

Based on the EntreComp model, in order to distinguish the sub-competences of entrepreneurial competence, the groups of sub-competences are divided according to the dimensions specific to the entrepreneurial process: ideas and opportunities (1), resources (2), into action (3) (Bacigalupo et al, 2016). In basic school, the EntreComp model is not suitable as a basis for assessing entrepreneurship competence, because it is difficult for the teacher to implement the model that gathers 15 sub-competencies in practical teaching. The disadvantage of the M-TEC entrepreneurship competence model is that it does not consider the dynamic nature of the business process (Mets et al. 2022, Silveyra et al. 2021). Therefore, a more suitable model for basic school is necessary for the assessment of various sub-competences.

The sub-competences assessed using the validated model are a prerequisite for the development of the student's entrepreneurial competence (Ilonen & Heinonen, 2018). Of the various sub-competences of entrepreneurship in basic school, entrepreneurship education has a positive effect on entrepreneurial self-efficacy and teamwork skills, which develop effectively in the 3<sup>rd</sup> and 6<sup>th</sup> grades (Saptono et al, 2021). Therefore, it is necessary to use age-appropriate tasks to assess the development of the student's entrepreneurship competence sub-competences and to develop an entrepreneurial attitude.

## **3. Assessment of the age-appropriate development of students' entrepreneurship sub-competences in the 3<sup>rd</sup> and 6<sup>th</sup> grades**

In 3<sup>rd</sup> and 6<sup>th</sup> grades, cognitive processes, self-determination, and entrepreneurial self-efficacy develop in the child's development (Bandura, 1977, Ryan&Desi, 2000). It is relatively easy to assess the student's way of thinking (cognitive skills) and social relations, which describe the student's actual knowledge and ability to remember, understand, apply, analyse, and synthesize (Ilonen&Heinonen, 2018). It is important that prior knowledge, attitudes, skills, and their pace of development determine what the student pays attention to when studying, which is why it is necessary to assess the sub-competences of entrepreneurial competence at different school levels to develop the student's entrepreneurial competence (Ilonen&Heinonen, 2018, Saptono et al., 2021).

The development of different sub-competences is possible through the development of cognitive and social skills and based on the attitude formed from prior knowledge. At different age levels, the sub-competences of students' entrepreneurial competence develop differently, for example, self-efficacy, motivation, creativity, planning skills, economic thinking, risk-taking, perception of the surrounding environment (Keane et al, 2016). The student's prior knowledge (common concepts, well-established knowledge) is manifested when solving tasks that distinguish different sub-competences, including discussing problems and situations where the student uses critical thinking when answering

multiple-choice questions (Lamb et al, 2020, MacCord et al, 2018, Vestheim & Lyngsnes, 2016). Previous studies have found that students develop critical and logical thinking in grades I and II, which is why tasks of different complexity are used to assess the sub-competences of entrepreneurial competence (Aronshtam et al, 2021).

Such tasks provide an opportunity to develop the student's initiative, problem-solving skills, innovativeness, creativity, and teamwork skills (Jardim et al, 2021). For example, in 1st grade, 7-8-year-old students, entrepreneurship manifests itself in finding an idea to solve a problematic situation and during the activity (Pepin, 2018), then different sub-competences of the student can be assessed. In basic school, assessment tools for students' entrepreneurial competence have also used aspects of social entrepreneurship development (Pinho et al, 2019), but the student's self-confidence, argumentation, respect, and sense of responsibility competencies have also been assessed (Feire, 1996). To the extent that the purpose of assessing the sub-competences of entrepreneurial competence is to find out the student's knowledge and attitudes about the sub-competences of entrepreneurial competence, they are related to previous and future knowledge and skills (Ilonen & Heinonen, 2018). First, the student's basic knowledge is assessed in terms of sub-competences. The purpose of the study was to evaluate the entrepreneurship sub-competences of 3rd and 6th grade students at different basic schools with a test. A quantitative study and factor analysis of the relationships between entrepreneurial sub-competences was conducted.

#### **4. Research problem, purpose, and research questions**

The assessment of partial competences based on the entrepreneurial process in grades I and II of basic school is in line with the development of cognitive and social skills for the development of entrepreneurial competence. However, there are few empirical reasons for assessing the sub-competences of entrepreneurship competence, therefore there is no starting point and validated measurement tool for assessing the different sub-competences of students' entrepreneurship competence.

The purpose of the article is to develop an assessment tool for evaluating different sub-competences of entrepreneurial competence in the 3rd and 6th grade in basic school.

1. How and with what is entrepreneurship assessed in basic school?
2. What differences appear in the 3rd and 6th grade entrepreneurial competence sub-competencies?

#### **5. Method**

##### **5.1. Sample**

Data from the students who participated in the study were collected as part of a larger research project. The research sample (3rd and 6th grade) consisted of 616 students from 19 Estonian basic schools. As many different schools as possible were included in the sample, considering their regional location and location (rural and urban school), school type (basic school, high school), class size (small and large classes, combined classes), previous entrepreneurship. educational experience (with experience, without experience). All students studied according to the national curriculum of the Estonian basic school. This article analyses the data of students who took the entrepreneurial competence sub-competency test in the 3rd and 6th grades.

The partial competences of students' entrepreneurial competence were assessed in the spring of the 3rd and 6th grades. There was a total of 616 test takers of entrepreneurial competence in both classes, 311 (50.4%) of them were girls and 290 (47%) were boys, 15 (2.6%) students left their gender unspecified. The sample included 13 urban schools and 12 rural schools from 15 different Estonian counties. The average age of the students was 10 years.

##### **5.2. Assessment tool and procedure**

A test was used to assess students' entrepreneurial competence, which measured knowledge and attitudes across different sub-competences of entrepreneurial competence (n=10). The sub-competencies of entrepreneurial competence are based on the theory of the entrepreneurial process and sub-competencies are divided into three stages or areas of the entrepreneurial process: opportunity discovery, resources, and implementation. Different stages of the entrepreneurial process combine several general competencies into entrepreneurial competencies.

In the tasks of the test, factual knowledge is differentiated according to sub-competencies, and based on situations, self-appropriate tasks show the existence of developed sub-competencies (attitudes), which can be quantitatively assessed (Keane et al, 2016). The measured sub-competencies are cooperation skills, economic and financial literacy, creativity, management and planning skills, involvement of resources, risk-taking, initiative, ethical and sustainable thinking, noticing opportunities

and self-efficacy. Since it is difficult to measure a student's skills with a test, in the first part of the test, students were asked to self-assess their skills and/or attitude towards the sub-competencies of entrepreneurial competence.

The test has two parts: a self-assessment of one's own competences, and the other is tasks that measure these competences. First, self-important tasks (n=8) to assess students' skills and attitudes, in which the student had to evaluate his actions or skills on a five-level coded Likert scale. The data of the assessment tool were coded so that they express the student's self-assessment: 1- inappropriate, 2- unsuitable, 3- suitable under certain conditions, 4- suitable and 5- most suitable.

The problem situations presented in the tasks were presented as short scenarios, the answers of which were based on the curriculum of entrepreneurship education and the sub-competencies of the EntreComp model of entrepreneurial competence. The tasks used in the test make it possible to assess the student's cognitive abilities (Aronshtam et al, 2021). In part II of the test, problem, and situation tasks (n=21) were used, in which the student's knowledge and attitude towards sub-competences of entrepreneurial competence were assessed. Each task had five multiple-choice answers, each of which provided information about the student's level of knowledge and attitude. As for the general abilities of the assessment tool, the answers were coded based on the student's knowledge: 0 - not selected, 1 - incorrect, 2 - partially correct, 3 - correct answer. The student could choose one answer and could continue with the test only when the choice was made.

The metrics of the assessment tool were divided into areas (1) noticing opportunities - ideas and opportunities, sub-competences related to vision and creativity, ethical and sustainable thinking; (2) resources - sub-competences related to self-efficacy, motivation, economic and financial literacy, and cooperation skills; into action (3), which brings together social skills, including community initiative, planning and management skills and risk-taking.

To achieve the validity of the assessment tool, a preliminary study was conducted with 2nd and 5th grade students in the spring of 2021, where in addition to student testing, the expert method was also applied. The assessment tool in the main study was tested with a written test on 69 students and a second time with an online test on an additional 49 students after adjusting the assessment tool to achieve an age-appropriate assessment tool. The dataset of the main study was divided into two according to the type of questions: self-directed and multiple-choice tasks. Analysing the individual tasks revealed that the reliability of the data (KMO) in the 3rd grade (N=327) p= 80% and in the 6th grade (N=290) p= 69%. Reliability of multiple-choice tasks (KMO) 3rd grade 60% and 6th grade p=64%.

### 5.3. Data analysis

To explain the differences in the sub-competencies of entrepreneurial competencies of 3rd and 6th grade students, group-centred methods were used in the data analysis, which allow comparing the classes with each other. In order to analyse the data, the sub-competency tasks of the entrepreneurial competence test of the development of understanding of basic skills were grouped into self-directed (1) and multiple-choice tasks (2).

Descriptive factor analysis finds out the variability of the solutions of the tasks used in the evaluation of the sub-competencies of entrepreneurship competence based on a reliable factor distribution by students and classes. Data analysis was performed in IBM SPSS Statistics using the principal component analysis method. Sampling adequacy was measured using the KMO test. As a result of the analysis, a three-factor model emerged, in which the sample reliability coefficient  $p = 0.61$  (Sig <0.001) is sufficient. After the communality analysis, features with a descriptive power (extract) below 0.3 or 30% were removed from the descriptive factor model, as in this case the feature has a small share with other features.

When analysing the multiple-choice responses, the model was rotated using the Varimax method to even out the factor distribution on the basis of a stronger relationship. When analysing self-relevant tasks, the model was rotated using the Oblimini method, since self-important questions are correlated with each other.

## 6. Results

The study gave results to the questions, which sub-competencies of entrepreneurial competence have developed and what are the differences between the 3rd and 6th grade. The reliability of the data used in the factor analysis of the self-assessment tasks tested in the third grades is 80%, which confirms the suitability of the model as a measuring tool for the sub-competencies of entrepreneurial competence. As a result of the descriptive factor analysis, various sub-competences were revealed, the metrics of which provided strong components in the factor model. Strongest in (1) finding opportunities was finding

ideas and opportunities (82%), (2) engaging resources, economic and financial literacy (82%), and (3) initiative in application (72%).

As a result of the analysis of the self-assessment tasks tested in the sixth grade, a three-factor model was also developed, in which the strongest components are (1) creativity in noticing opportunities (82%), (2) involving resources, economic and financial literacy (68%), planning and management skills (66%), resource mobilization (64%) and (3) taking action, risk-taking (69%) and teamwork (77%).

The results of the third-grade multiple-choice analysis show (1) opportunity recognition (85%) and ethical and sustainable thinking (84%), (2) economic and financial literacy (39%) in the area of resource mobilization. the strongest components in recognizing opportunities and (3) taking initiative (67%) and taking risks (60%).

As a result of the analysis of the sixth-grade multiple-choice test, the strongest component in recognizing opportunities was ethical and sustainable thinking (72%) and recognizing ideas and opportunities (71%), (2) resources, economic and financial literacy (70%), resource mobilization (60%) and (3) initiative in implementation (64%).

The results of the study are so reliable that the sub-competencies of entrepreneurship competence as a phenomenon and its connections are studied, and it is not recommended to make assessments about all Estonian students.

## 7. Conclusions and summary

Based on the research, we can see that the students' self-assessment of entrepreneurship sub-competences differs from the actual entrepreneurship competence. There are no previous studies on the tasks based on which the entrepreneurship of I and II grade students is evaluated. Thus, this empirical study is an important starting point for further research. Previously, the types of entrepreneurial tasks were analysed, and the sub-competences developed with tasks in basic school were identified (authors, 2021). This study then provides a theoretical framework and a validated measurement tool for elementary student development in basic school.

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