ICEE Innovation Cluster on Assessment

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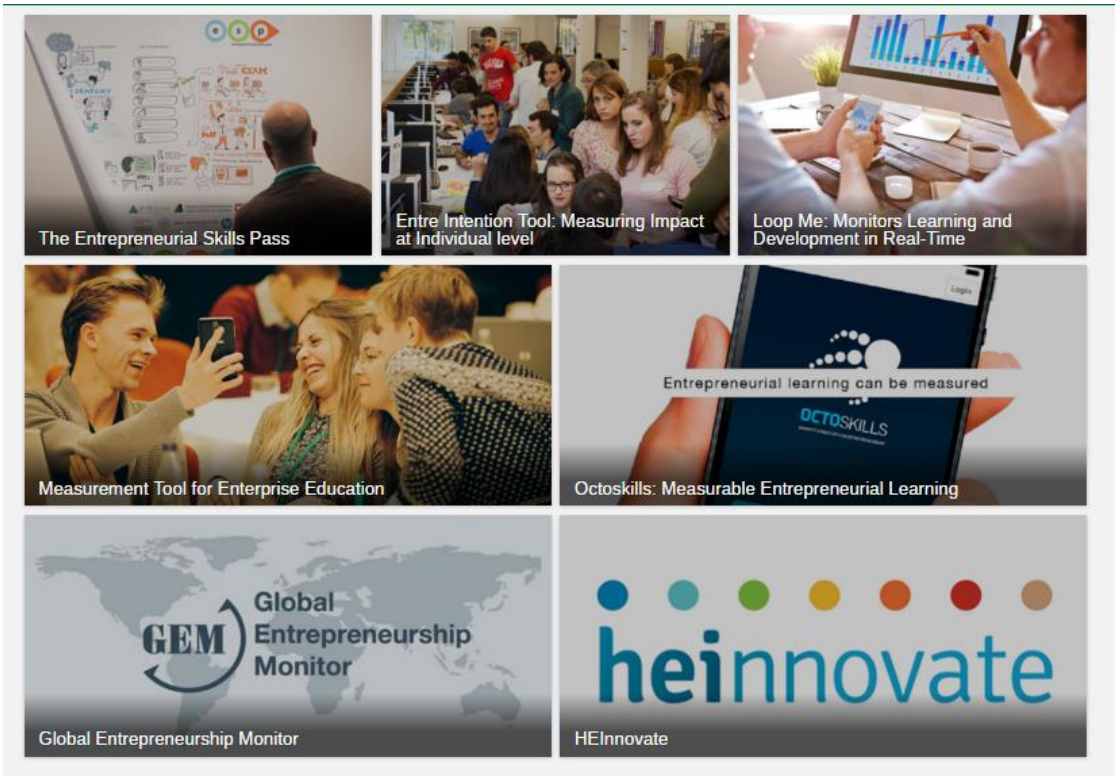

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1. Introduction

The Innovation Cluster for Entrepreneurship Education (ICEE) is a 3 year policy experimentation project (February 1, 2015 - 31 January 2018) that aims to explore the impact of entrepreneurship education through field trials and research.

Within the project, all partners participated in a peer evaluation exercise, by sharing good practices available at national and regional level and discussing success factors and policy recommendations on four main topics:

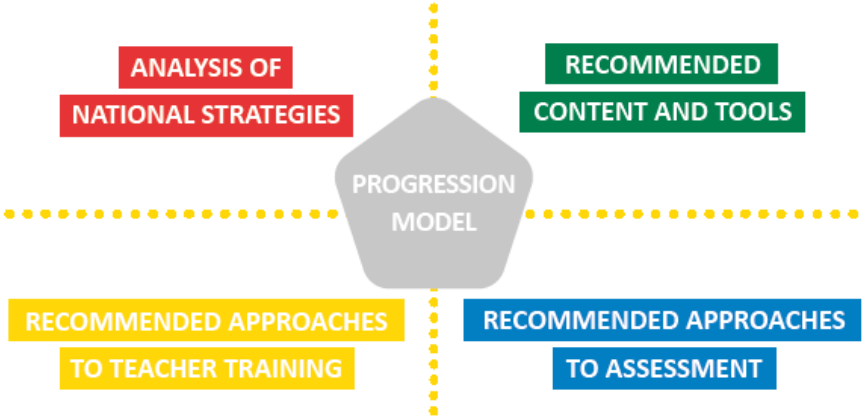

Figure 1: ICEE Innovation Clusters

The final purpose is to define a common progression model describing how entrepreneurship education can flow from primary to upper secondary and to combine outcomes of the innovation clusters and results of the field trials to provide policy recommendations on how to ramp up the penetration of entrepreneurship education in European schools.

2. Assessment Tools in Entrepreneurship Education

The Importance of Measuring and Mapping the Progress

"Entrepreneurship education" and **"entrepreneurial learning"** have become major areas of policy development in Europe. How can we encourage more creative thinking, promote a strong sense of self-worth, initiative and a tolerance of failure? How can we stimulate enterprising behaviours? How can we help young people develop the skills and mind-set to be able to turn ideas into action? Since 2004, entrepreneurship has been formally included as a key competence for all learners, supporting personal development, active citizenship, social inclusion and work-readiness. It is relevant across the lifelong learning process, in all disciplines of learning and to all forms of education and training (formal, non-formal and informal) which contribute to an entrepreneurial spirit or behaviour, with or without a commercial objective. Research has shown that entrepreneurship education can be an effective means to reach these outcomes, but also shows the importance of recognising that different approaches to entrepreneurship education will impact these outcomes to different extents and have different effects on different types of pupils and students.

Assessment of the outcomes of entrepreneurship education is essential to determine the degree to which goals has been reached. Given the complexity of the field and the great variety of approaches that can be used in many different contexts, we still have limited knowledge about the effectiveness of entrepreneurship education. Since programme evaluation is a fairly complicated and resource consuming activity, performing it is often not a prioritised activity, not even when new approaches within the field are introduced. It is therefore important to identify **user-friendly and**

valid assessment tools that can be used by the practitioners to assess the outcomes and the impact that different educational approaches have.

Given the intricacy of the education system and its multilevel structure, and the fact that education systems are different from country to country, it is not an easy task to solve. To add to this challenge, the most interesting outcomes, from a policy maker's point of view, only materialise many years after the educational intervention and thus require a longitudinal evaluation. On the other hand, we have the teachers and practitioners who typically need valid information about how they influence their students in the short term in order to be able to adjust and improve their teaching. So, we are dealing with conflicting requirements when it comes to assessment tools for entrepreneurship education.

This report provides an overview of the guidelines and recommendations coming out from the ICEE Innovation Cluster on Assessment. The document targets policy makers and practitioners but it is also useful for all those institutions and organisations who want to start assessing entrepreneurship education activities. To this end a toolbox of user-friendly assessment and evaluation tools that can be used at different educational levels to assess multiple outcome variables is presented in Annex I. All the tools described are also available online (http://innovation-clusters.icee-eu.eu). They were selected because all have been tested in multiple international studies and have proven to work well in different national contexts.

2.1 A Broad Topic and a Diverse Field

Impact studies within the field of entrepreneurship education have traditionally been focusing on whether or not the educational initiatives increase the number and the quality of start-ups (see for example Charney & Libecap, 2000; McMullan & Long, 1987). In order to assess the short-term effects of initiatives within the field, many programme evaluations have focused on how education in the topic influences the participants' level of entrepreneurial attitudes and intentions (Fayolle & Gailly, 2013; Krueger, 2009). The focus has today shifted towards assessing entrepreneurial competences and skills. These include willingness to take initiative, innovativeness and creativity, problem-solving skills, willingness to take risks, self-confidence, ability to collaborate and social skills. However, the youth unemployment situation in Europe call for research to continue to explore entrepreneurial intentions and perceptions of skills among students. There are several studies that have demonstrated the effectiveness of JA-programmes in increasing students' entrepreneurial attitudes and intentions as well as their confidence in performing entrepreneurial activities (see for example: Johansen et al., 2011; Johansen & Foss, 2013; and Somby & Johansen, *forthcoming*).

The focus on venture creation is, however, not applicable in all educational settings. Still, the transversal character that entrepreneurship has, has made many teachers inclined to implement elements of entrepreneurship education in their curricular. The style of teaching required to effectively foster entrepreneurial skills and competences is, however, unfamiliar to many teachers. In addition to this, it is typically difficult to assess entrepreneurial skills since they are of a non-cognitive character and thus difficult to codify. Teachers are the main drivers, but also the main hindrances to implement entrepreneurship education in European schools. Research which address teachers' role, their views on pedagogical methods, and their identification of hindrances and drivers to implementing entrepreneurship education is important to understand. In order to do this, it is important that the teachers participate actively in the assessment processes. It is therefore important that the assessment tools available are user-friendly and easy to apply for the teachers,

and that these tools offer immediate feedback and help teachers monitor their pupils' or students' development; as well as the teacher's own development.

2.2 Identifying and Selecting the Assessment Tools

The Innovation Cluster on Assessment is one of the working groups set up in the ICEE project. Participating organizations are FFE-YE (in a leading role), Latvia Ministry of Education, Enterprise Flanders, JA Italy, ENRI, Strossmayer University and JA Europe[1].

Each member was assigned to identify suitable assessment tools that could be included in a tool box for teachers and used by policy makers. The criterion for inclusion was that the effectiveness of the tool should have been demonstrated in international studies in multiple national contexts. Six tools out of seven analysed[2] were selected to be included in the final tool box.

2.3 Six Assessment Tools

The tools that have been selected to be included in the tool box have all been tested and validated in international studies. There are some overlaps between them but they answer different questions, focus on different outcomes and thus fulfill different needs.

The ***Global Entrepreneurship Monitor*** (GEM), for example, is a well-established international survey which has been running for many years. It mainly assess countries' entrepreneurial development and compare this with the development of other countries.

The ***OctoSkills*** tool, the ***Entrepreneurial Skills Pass*** (ESP) and the ***Entre Intention*** all focus on students' entrepreneurial development. However, the tools have different target groups and fulfill different needs. ESP is specifically developed for Junior Achievement's Company Programme students at secondary level and has a strong focus on assessing both the students' cognitively-oriented entrepreneurial skills and their self-confidence in performing non-cognitive entrepreneurial skills, and how this self-confidence develops. The Entre Intention tool is specifically developed for tertiary level students and has a strong focus on attitudes and intentions towards pursuing a career as self-employed. It is thus best suited for assessment studies of venture creation programmes and courses. The OctoSkills tool has, similar to ESP, a strong focus on how students develop their self-confidence in performing non-cognitive entrepreneurial skills and how their educational motivation and school engagement develop. This tool, however, includes questionnaires that are developed specifically for the primary, secondary, tertiary level of education and it includes a questionnaire which assesses how the teachers develop their self-confidence in teaching in an entrepreneurial manner.

The ***Measurement Tool for Enterprise Education*** (MTEE) focuses on teachers. It is developed to be used at primary and secondary level and in VET education. The focus is on how the teachers develop their entrepreneurial know-how and their educational practice. It also provides systematic feedback and useful tips about how the teacher can develop a more effective practice and entrepreneurial teaching methods. Similar to MTEE the ***LoopMe*** tool's main focus is to assist teachers in developing their practice, even though its focus on activities can also be used to

[1] The members of the ICEE Innovation Cluster on Assessment are: Kåre Moberg (FFE-YE) Johan Van Herck and Ellen Cardon(Enterprise Flanders); Gunta Araja (Latvia Ministry of Education); Miriam Cresta (JA Italia); Slavica Singer and Julia Perić (Strossmayer University); Ines Elezovic and Maja Jukic (NCVVO); Kristine Lundhaug (ENRI); Livia Di Nardo (JA Europe).

[2] From this specific tool we have not included HEInnovate because the tool is addressing Universities and Tertiary institutions and the Toolkit targets secondary school teachers.

evaluate educational initiatives. LoopMe can function as an effective means for a teacher to receive formative feedback from pupils and students and thus get information about activities they perform when they are not directly monitored by the teacher.

Each of the assessment tools is described in detail below.

The Global Entrepreneurship Monitor (GEM)

The Global Entrepreneurship Monitor (GEM) survey was initiated in 1999. The survey quickly grew and is today the biggest entrepreneurship survey in the world, covering 100+ countries. Each partnering country has national team that participates in GEM's global consortium "Global Entrepreneurship Research Association" with three tasks: to conduct surveys among adults and experts, interpret the collected information and make them available to researchers and policy makers. Each participating country performs a yearly survey in which a random sample of at least 2,000 adults, 18-64 years of age, is interviewed. The survey is questionnaire-based and focuses on the respondents' perceptions about their individual attributes and attitudes (toward recognition of opportunities, own abilities and intentions to act entrepreneurially, toward fear of failure), about societal values toward entrepreneurship (to pursue a career as self-employed, societal appreciation of entrepreneurs) and different types of entrepreneurial activities (self-employment, social entrepreneurship, entrepreneurial/innovative activity of employees in established businesses). In addition, the group of experts (minimum 36 in each country) selected on criteria of their references in specific fields of entrepreneurship ecosystem (finance, education, R&D transfer, regulatory framework…) are asked to evaluate the quality of ecosystem.

Using GEM in assessment studies

The GEM survey is based on very strict requirements related to data collection in order to build national and international high quality database needed for identifying trends and patterns in different aspects of entrepreneurial activities of individuals and quality of entrepreneurship ecosystem as context in which entrepreneurial activity is performed. It is also possible to add specific questions to the national surveys in exchange for a fee. GEM provides three types of publications: annual global report (containing results of each participating country), special reports on selected topics (e.g. education, finance, women, youth, senior entrepreneurs…) and national reports. In 2008, GEM had a specific focus on entrepreneurship education in their global survey. In Denmark, the Danish Foundation for Entrepreneurship financed a sub survey in GEM with a specific focus on entrepreneurship education in 2010 and 2014. Since the same questions were used in each of these surveys, and the respondents were randomly selected, it was possible to assess how the country had developed when it came to entrepreneurship education and how this had influenced other variables included in the survey. GEM can thus be a very useful assessment tool for policy makers, also when it comes to evaluating initiatives in entrepreneurship education.

OctoSkills

OctoSkills is an app and web-based assessment tool based on the ASTEE survey[3]. The focus is on assessing how students and pupils develop their entrepreneurial self-efficacy, that is, their self-

[3] The ASTEE (Assessment Tools and Indicators for Entrepreneurship Education) survey was collaboratively developed by organisations residing in 7 countries (Denmark, Ireland, Germany, Portugal, Croatia, France, and Belgium). Questionnaire-based assessment tools for entrepreneurial education at primary, secondary and tertiary level were

confidence in performing entrepreneurial skills and activities[4], and whether the educational initiative changes their entrepreneurial attitudes and intentions. In addition to this, OctoSkills has a strong focus on school engagement and educational motivation and how the students' and pupils' relations with classmates and teachers develop. The assessment tool is developed to be used at primary, secondary and tertiary level of education. The wording of the questions is neutral, so participants who are not familiar with entrepreneurship will also understand the questions and be able to assess them in a meaningful way[5]. The analysis is automated which means that the teacher or the practitioner gets immediate information about their pupils' or students' level in the dimensions measured and how they have developed on these dimensions. With an accompanying desktop solution they, or someone at the school management, will be able to compare the results with other schools and classes as well as other countries and different student types[6]. All results are presented in user-friendly "spider web" diagrams, which makes it easy to compare results and assess how the participants have developed.

Using OctoSkills in assessment studies

The surveys can be distributed either as a pre-mid-post survey or as a reciprocal survey. The pre-mid-post survey is distributed before the educational initiative is initiated, in the middle of it and after it has been completed. This makes it possible to assess how the participants develop during the programme and not only after it has been completed, which allows the teacher to adjust his or her teaching during the educational initiative, based on the information achieved from the pre and mid assessments. If the educational initiative that needs to be tested is short, the mid-test could be distributed right after the completion of the initiative and the post-test as a follow-up a couple of weeks or months later, in order to assess the "stickiness" of the effect. The reciprocal test, on the other hand, is distributed after an educational initiative has been completed. In this survey type the participants are asked to assess at which level they perceived themselves to be before participating in the educational initiative, and at which level they perceive themselves to be now, after the educational initiative has ended. This survey type is typically useful for educational initiatives that have already started but in which some kind of assessment study is still wanted.

The OctoSkills tool also includes a questionnaire for teachers, which allows teachers to evaluate how they have developed their self-confidence in teaching entrepreneurial and enterprise education and to assess how their teaching methods have developed. The teacher questionnaire also makes it possible for an evaluator to assess how different teachers affect their students and to analyse the effects of different background variables and teaching styles.

With its user-friendly interface and possibility to access information and results immediately, the OctoSkills tool can be very useful for teachers and schools that wish to evaluate their educational initiatives. Similar to standard questionnaire-based assessment studies, the OctoSkills tool can also be used in large scale evaluation studies. It has the advantage over "normal" evaluation studies in

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developed and tested in 13 countries (in addition to the seven partnering countries it was also tested in: Sweden, United Kingdom, Italy, Austria, Romania, and Spain). The development of the assessment tools was performed as an EU-project co-funded by the Competitiveness and Innovation Framework Programme (CIP).

[4] See Bandura 1977, 1997 for an in-depth description of self-efficacy theory and McGee et al. (2009) and Moberg (2013, 2014) for an in-depth description of entrepreneurial self-efficacy.

[5] Many assessment scales within the entrepreneurship education field have been developed based on the activities of practicing entrepreneurs. This often makes the wording of the questions very business and start-up biased, which makes it complicated for many respondents to understand them, especially respondents at lower levels of education and respondents in control groups.

[6] Naturally all participating schools, teachers, students and pupils are anonymous.

that it makes it possible to easily follow the participants over a long time period, as identification is not a problem. In addition to this, it is typically motivating for participants in these types of studies to get immediate access to the results. An example of such a study is the You'th Start Entrepreneurial Challenges Project[7]. OctoSkills can thus be very useful for policy makers who wish to assess large-scale educational initiatives or who want to establish assessment as a natural component in educational initiatives. For more information about OctoSkills, visit www.octoskills.com

The Entrepreneurial Skills Pass (ESP)

The Entrepreneurial Skills Pass was developed in an international collaboration project co-funded by the European Commission (2013-2016)[8]. The main goal of this project was to develop a validated qualification that can certify the entrepreneurial knowledge, skills and attitude of students participating in the JA Company Programme, an entrepreneurship programme at secondary level which stretches over a whole school year. By participating in the ESP students can take part in a practical entrepreneurial experience (JA Company Programme), assess their entrepreneurial competences as they progress through the year and then sit for a final exam to certify their business, economic and financial knowledge and skills.

The final exam aims at assessing, validating and certifying students' theoretical and factual knowledge (facts, principles, theories and practices related to a field of work or study) as well as their cognitive and practical skills (the ability to apply knowledge and use know-how to complete tasks and solve problems). It draws questions from a question pool which covers various areas of knowledge that have been taught/trained during the Company Programme (e.g. general understanding of organisations; main steps and legal requirements; from idea generation to the market; financial resources and budgeting). A prerequisite to taking the final exam is that JA Company Programme's students have also participated in the self-evaluation survey, a pre and post-test students can use to assess their entrepreneurial competences (e.g. creativity, perseverance, self-confidence, etc.).

Only the students who participated in the practical entrepreneurial experience, took the self-assessment and correctly answered 70% of final exam's questions will get a certificate issued at international level by relevant organisations such as EUROCHAMBRES and CSR Europe.

Using ESP in assessment studies

The self-assessment survey used in ESP is a shortened version of a research-based survey which has been applied in multiple international assessment studies[9]. The focus of this survey is similar to the one in OctoSkills but has an additional focus on the participants' perception of entrepreneurs and entrepreneurship. The combination of a self-assessment survey and a standardised test (final exam)

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[7] You'th Start Entrepreneurial Challenges is a policy experimentation project where a flexible and challenge-based entrepreneurship programme is tested at primary and secondary level in four countries (Slovenia, Portugal, Austria and Luxemburg). For more information about the project, see www.youthstart.org

[8] The project, led by JA Europe in cooperation with lead partner in this project was Denmark (the Danish Foundation for Entrepreneurship). It was developed in cooperation with the Austrian Federal Economic Chamber (WKO) and the European Business Network for Corporate Social Responsibility (CSR Europe). It involved nine JA national partners in Austria, Czech Republic, Denmark, Estonia, Greece, Italy, Romania, Slovakia and Switzerland. For more information about the project, see http://entrepreneurialskillspass.eu

[9] The self-assessment survey which ESP is based on is currently used in the ICEE field trial. The shortened version used in ESP is made possible due to the possibility of using the "starting values" that have been established in large scale surveys where the original survey tool has been applied.

can be used to efficiently assess how the respondent has developed, both regarding non-cognitive entrepreneurial skills and cognitively-oriented entrepreneurial skills; especially if both are distributed in a pre/post manner.

Since ESP is used as a certification of entrepreneurial competence and it is available to the 350,00 students participating in the JA Company Programme every year. This has to do with the large variety of approaches to entrepreneurship education that exist today, and that in order to function as a certificate it is important that the educational experience is standardised. There are also administration costs related to the standardised test and the certification process. The ESP is therefore fee-based, and in order to use it, either the participants or other parties need to cover the costs involved.

ESP can be useful from a policy maker's point of view. Whereas in principle it can be used to evaluate any type of educational initiative at secondary level which focuses on entrepreneurship and new venture creation, it is specifically developed to assess and certify students who have participated in Company Programme. Given the popularity of Company Programme and the number of participants which this educational initiative has, ESP offers a lot of information that can be used to compare in what extent different countries focus on entrepreneurship education.

Entre Intention Tool

Similar to OctoSkills and ESP, the Entre Intention Tool focuses on students and it is structured as a pre-test post-test evaluation. It is based on the well-established theory of planned behaviour (TPB) framework (Ajzen, 1991, 2002) and the scales included in the tool are largely based on Kolvereid (1996). The TPB framework has been applied in several assessment studies in entrepreneurship education (see for example Fayolle, 2005; Krueger & Carsrud, 1993; Kolvereid, 1996). The focus in TPB is on intentions as a predictor of future behaviour. Since intention to perform a specific activity has a much higher predictive validity than for example demographic variables it makes good sense to focus on intentions in assessment studies, especially when it comes to complex activities as entrepreneurship and venture creation, as this kind of behaviour typically has a significant time delay (Bird, 1988).

According to Ajzen (1991), three variables are the main antecedents to intentions: 1) Attitudes towards the behaviour; 2) Perceived Behaviour Control; 3) Social Norms. All other factors that affect the intention to perform the specific behaviour are mediated by these three variables, according to Ajzen (1991). This assumption makes TBP a very practical framework to apply in assessment studies since it implies that you do not have to measure and control for any other factors. However, several studies have demonstrated that variables such as prior entrepreneurial experience still influence the impact which the three antecedents have on the respondent's level of intention (see for example Fayolle & Gaily, 2014 and Moberg, 2014), and other studies have demonstrated that both gender and self-efficacy directly influence an individual's level of intention as well as behaviour.

Using Entre Intentions in assessment studies

The tool was specifically developed to be used in assessment studies of entrepreneurship programmes and courses at tertiary level. It is available in both hard copy and online format. There is a strong focus on new venture creation in this assessment tool and it is thus most useful when evaluating educational initiatives with a narrow outcome goal. It can be used to follow the respondents longitudinally and it gives the evaluator information about how the respondents develop when it comes to their attitudes towards self-employment (attitudes), their perceived competence to control and perform activities required in new venture creation processes (perceived behaviour control), and how supportive they perceive that people in their surrounding

are towards the behaviour (social norms). In addition to the traditional TPB measures, the Entre Intentions tool also includes measures of entrepreneurial characteristics and skills as well as the respondent's experience with entrepreneurial activities and education in the topic.

Although this tool has a narrow focus on entrepreneurial activities it can be used in many different assessment studies of courses and programmes which focus on new venture creation. It is based on a well-established framework and the majority of the scales have been used in multiple studies for more than 20 years. This offers vast possibilities for comparison as well as opportunities for standardised meta-analyses[10].

LoopMe

LoopMe has a different approach compared to the more traditional pre-test/post-test assessment tools described above. Rather than quantitatively assessing the outcomes of an educational initiative, LoopMe focuses on the activities that take place during the educational initiative. Theoretically, the experience-sampling method that LoopMe applies aligns to the proxy-theory, that is, the assumption that certain activities lead to certain outcomes. Since activities are typically easier to register and measure than their outcomes, it makes good sense to focus on activities.

LoopMe gives pupils and students the opportunity to report situations and events which trigger their emotions. They are asked to fill out a form about which activity they are performing and how they feel about it, and then send this report to their teachers (anonymously, if they wish). The teachers can then respond to the pupil's or student's report. This creates a "loop" of feedback between teacher and student. The "looping" of mutual reflection on the activities makes LoopMe a very effective tool for formative evaluation, both from the student to the teacher and vice versa. This possibility for students and teachers to communicate in an "online" manner is important in entrepreneurial education which typically includes many learning activities that take place outside the classroom and the teacher's control.

Using LoopMe in assessment studies

The structure of LoopMe offers multiple possibilities for practitioners and evaluators to assess educational initiatives. The formative feedback that is generated through the "loops" creates a good basis for teachers and practitioners to evaluate and assess their practice. It is, however, a bit more challenging to apply the tool in quantitative evaluations since it is voluntary for the participants to send in reports. Multiple threats to the internal validity thus need to be accounted for[11] when LoopMe is used in its default setting. However, if all participants are asked to report their activities at certain time points, many of these problems will be solved and it will be possible to make a fair comparison between different educational initiatives regarding the kind of activities that take place as part of these initiatives[12]. Based on this information, it is possible to assess how "entrepreneurial" and challenging the initiative has been and how many opportunities for entrepreneurial learning it has offered. The gains regarding increased internal validity from an

[10] For examples of studies where the tool has been applied, please see: Joensuu-Salo, Varamäki & Viliamaa (2015), Varamäki, Joensuu, Tornikoski & Viliamaa (2015), and Joensuu, Viliamaa, Varamäki & Tornikoski (2013). Contact Sanna Joensuu-Salo (sanna.joensuu-salo@seamk.fi) for more information about the tool.

[11] It can be expected that the participants' inclination to send in reports are different, depending on multiple factors. This can easily create many unfortunate response biases depending on different factors such as the background of the students, how successful they have been in their activities, how much time has been allocated to the activity, instructions from the teachers about how to use the app, etc.

[12] See Csikszentmihalyi and Larson (1984)

evaluation point-of-view would, however, come at the expense of the usefulness that LoopMe offers practitioners when it comes to formative evaluation, because this type of feedback is typically more interesting when submitted on a voluntary basis.

In qualitative evaluations of educational initiatives LoopMe can be very useful. The evaluator can select whom to interview based on the "loops" that the participants have provided and thus select, for example, individuals who have had positive experiences or individuals who have had negative experiences. The "loops" can also be used as "anchors" in the interviews, that is, as experiences that can be discussed and elaborated upon.

LoopMe is thus a very useful education as well as evaluation tool for teachers and practitioners. Its focus on activities supports qualitative evaluations in a very good way. With a structured data collection process and a clear evaluation protocol it could also offer a lot of insight into which types of activities are taking place in different educational initiatives. These activities can then be linked to different outcomes that can either be assessed with qualitative methods, longitudinal data or with one of the "pre-test/post-test" based evaluation tools presented above[13].

Measurement Tool for Enterprise Education

Similar to OctoSkills, the Measurement Tool for Enterprise Education (MTEE) has a strong focus on teacher development. It differs from the other tools as there is no focus on students and pupils. It is a short and user-friendly self-evaluation tool that teachers can use to evaluate their own education and their development. The tool focuses on five dimensions: 1) Development; 2) Planning; 3) Activities; 4) Pedagogy; 5) Culture. You reply to a short questionnaire (5-10 minutes) and get information about how you score in these five categories compared to the mean average of other teachers who have taken the test.

Using the Measurement Tool for Enterprise Education in assessment studies

The answers are automatically recorded, which makes it possible for respondents to personally assess their development. An evaluator can use the tool to assess how a specific intervention affects a group of teachers' development in enterprise education. A major strength of the tool is its user-friendly design. It is very easy for teachers to use the tool, and the direct information that it offers to respondents creates a nice incentive for them to stay in the survey and take the test on a regular basis (recommended every sixth month). This is important to underline as many evaluation tools are perceived as being quite tedious to the users, and when this is the case it can lead to unserious responses and respondents dropping out of the survey.

The five dimensions, which the tool focuses on, offer the evaluator fairly specific information. This makes it possible for an evaluator to use the tool as a baseline test, and thus, to assess which areas need to be improved the most. It also enables the evaluator to assess which area a specific intervention has influenced, if the test is used as a pre-test/post-test. For policy-makers it can be interesting to assess how an intervention, for example a large scale teacher training programme, influences the teaching of different types of teachers in different educational contexts.

3 Assessing and Understanding the Effects

Since the EU recognised entrepreneurship as one out of eight key competences all European citizens should possess, there has been a strong focus on implementing entrepreneurial education

[13] See Lackeus (2014) for an example of how LoopMe can be implemented and combined with qualitative research methods

at all levels of education. This increased focus has greatly increased our understanding about how different educational approaches within the field influence pupils and students. An important topic in policy discourse is the potential impact of entrepreneurship education on transversal skills, learning outcomes, motivation and academic performance. In national strategies, government white papers and other policy documents, entrepreneurship education is considered a viable tool to help reduce the dropout rate in secondary schools, improve school motivation and school performance. The EU has been a leading actor in this development. The policy experimentation projects in the Erasmus+ programme are important examples of this and there is also a strong focus on assessment and evaluation of entrepreneurship education in their Horizon 2020 programmes. However, resources allocated to research and assessment of initiatives in the field is dwarfed compared to the numerous implementation projects that have been performed. Although in the end it is the implementation that counts, it is unfortunate that very few resources are allocated to research and assessment of initiatives within the field.

There are numerous ways entrepreneurial education can be taught at different levels of education. These approaches will affect different types of students in different ways. In order to increase our understanding of this it is important that multiple comparative assessment studies are performed, especially when the educational initiative is new and untested.

User-friendly Assessment Tools

In order to further our understanding of how different approaches within the field influence different types of pupils and students, it is important to have assessment tools which incentivise practitioners to use them. The best practice used to be questionnaires that could be scanned in order to quickly prepare the data for analysis. Today there are many survey tools that offer an automated analysis, which makes it possible for practitioners to access the information immediately.

Naturally, teachers will be more incentivised to use assessment tools which directly show how they have influenced their particular pupils or students compared to tools where they are only passive data collectors in a large scale evaluation project. There is, however, room for a lot of improvements for the tools that exist today. It should be pointed out that user-friendliness and engagement are dimensions that are typically important for both the validity and the reliability of the assessment tools. Features that increase these dimensions should therefore be encouraged. Gamification, for instance, offers multiple features that increase engagement and incentivise the user to participate and complete the surveys. All assessment tools presented in this report could probably be improved by gamification features without losing out on the academic credibility. It is, however, costly to develop these types of tools, but the information such an engaging assessment tool would provide us with would most likely cover its development cost.

Applied in Rigorous Assessment Projects

In order to identify best practices in this complex field it is important that practitioners have the ability to assess their own practice. However, entrepreneurial education is new to many teachers and many feel unsure of their ability to teach the topic or to use entrepreneurial teaching methods. It is therefore important that dedicated assessment and research projects, which apply the highest standard of evaluation methodology, are implemented.

When assessing educational initiatives there are multiple factors that can influence the outcomes. Unlike experiments in natural science it is impossible to control all factors since the experiment cannot be performed in a vacuum. This makes it difficult to isolate which factors in the educational initiatives have generated which outcomes. Many assessment studies of entrepreneurship education have been performed but unfortunately there is a lack of studies that apply the highest

standards of methodological rigor such as randomization, comparative studies and matching of respondents. There is also a lack of mixed method studies where rigorous quantitative studies are combined with qualitative methods. This is unfortunate since it is typically qualitative methods that will provide us with insight into how specific dimensions in the educational initiative have influenced different types of participants.

The majority of the assessment tools presented in this report are products of research projects that have tried to answer different research questions. In order to develop best practice and more useful and valid assessment tools for different levels of education, it is important that the support for this type of research projects is continued.

4. Recommendations

Allocate more resources to assessment studies: Rigorous assessment studies are costly to perform, but their importance cannot be understated. Due to the importance of randomisation it is difficult to perform RCTs and when they also include qualitative methods they become very resource-intensive. It is very positive that the amount of resources allocated to initiatives in the field greatly been increased during the last decades. However, the resources allocated to implementation compared to research and assessment are very uneven. We therefore recommend that, as a minimum, 10 percent of the resources assigned to new educational initiatives within the field should be allocated to assessment.

Embed assessment into educational initiatives: As stated many times in this report, there are numerous ways to teach entrepreneurship. Different approaches will influence different types of pupils and students in different ways. Teachers typically know their students and pupils very well and know how to adapt different educational approaches to fulfill their particular needs. Many teachers are, however, inexperienced when it comes to entrepreneurship education and therefore unsure of their ability to equip their pupils and students with entrepreneurial competences and skills. It is important that they retain the freedom to adapt and alter best practices within the field so that these fit their particular pupils' and students' needs. Since it is difficult to assess entrepreneurial skills and competences with traditional evaluation methods, such as standardised tests, it is important that teachers use other types of evaluation tools to assess how they influence their pupils and students and whether or not their teaching has the intended effect.

The assessment tools that were to be embedded and used by multiple educators on a regular basis need to be sufficiently detailed in order to capture differences in a large variety of teaching approaches and they also need to include the different levels that will influence the outcomes. The data collected by such a tool would offer us a fantastic opportunity to really increase our understanding of how a large variety of teaching approaches influence different types of pupils and students at different levels of education.

Embed Assessment in all levels and to all target groups. Assessment is crucial to evaluate students' competences and skills but it is also crucial for teachers to assess the effectiveness of their entrepreneurial education activities in the classroom as well as for schools. School self-evaluation should be included in the overall assessment framework. This approach can support schools to monitor and adjust implementation of entrepreneurship education.

Develop coherent assessment and evaluation frameworks: new tools and criteria to help teachers in assessing entrepreneurial competences and skills – for both summative and formative purposes – are needed. Classroom-based formative assessments emphasize in-depth questioning and extended dialogues, self-and peer-assessment as well as feedback and guidance on improvement. Innovative approaches to summative assessment, such as portfolio assessments or ICT-based assessment allow learners to demonstrate complex skills and reasoning processes. Multiple

measures of schools and learner achievement over time provide a better view of overall performance.

Use ICT tools to improve and scale assessment practices: ICT technology has greatly improved the possibilities to create efficient and user-friendly assessment tools. The field is very complex and multiple outcomes need to be covered. It is therefore important that the existing tools are improved and that additional tools are created. In order to be able to efficiently develop user-friendly assessment tools it is necessary that the development team have competences in such varied field as education, research, statistics, design, programming, and knowledge about different types of users. Pupils and students at different levels of education have very different skill levels in language and technology which is necessary to consider when developing assessment tools. However, when users themselves are incentivised to use assessment tools it is significantly more doable to embed assessment into educational practice. This will considerably improve educational practice and further our knowledge about the effects and influence which different approaches have on different types of pupils and students.

Allocate more resources to research projects: Assessment studies are often limited to a particular programme and the room for experimentation and trying out new assessment methods is often limited. In order to further our knowledge about how different educational approaches affect different types of pupils and students it is important to perform comparative analyses. Research projects are typically not restricted to particular educational initiatives. This increase the flexibility of which questions can be asked and which methods and assessment tools can be applied. It is also important that evaluators get the time to really analyse the data. This typically requires dedicated research projects. We therefore recommend that universities and research centres should be included in development projects and that funding should be allocated to research in the field.

5. Concluding Remarks

In this report we have discussed the importance of assessing the influence and the effects of different initiatives in entrepreneurial education.

A lot of challenges need to be addressed when performing assessment studies, but the importance of the knowledge which these types of studies generate justifies the costs. In order to improve educational practice within the field it is important that practitioners and teachers are able to assess their own educational initiatives. To do this, we need user-friendly assessment tools offering the users direct information about how they have developed or how they have influenced their pupils and students.

In this report we have presented assessment tools that can be used to assess different aspects and dimensions of various educational initiatives. To further our knowledge about how different educational approaches influence different types of pupils and students it is, however, also necessary to perform large scale assessment studies with rigorous experimental design. There is today a severe lack of studies with a high standard methodology. It is complicated to randomise educational interventions and to compare effects of different initiatives, and it is very resource-intensive to use qualitative methods in such studies. Nevertheless, it is of considerable importance that resources are allocated to these types of projects if we want to increase our understanding of how to best guarantee that the current generation as well as future generations will have the ability to act entrepreneurially in many different contexts.

The Policy experimentation project under Erasmus+ is a good example of a project that makes this possible, but it will be important to continue this effort on a larger scale in the future.

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Annex I - Assessment and Evaluation Toolbox

There are many different things that can be assessed when you teach entrepreneurship, and there are many different ways to assess this. Entrepreneurship and entrepreneurship education are broad concepts and different approaches have different teaching and learning goals. These different teaching and learning goals require different assessments.

We have included five assessment and evaluation tools in this toolbox which you can use to improve your teaching practice. The easiest way to find out which of the tools fits your needs is to answer the questions below.

What do you want to do?

1) Evaluate your own teaching and get information about how you develop as an entrepreneurial teachers? [MTEE, OctoSkills]
    - We recommend that you use The Measurement Tool for Enterprise Education for this but the OctoSkills evaluation tool can also help you do this.
2) Assess how you influence your pupils' and students' entrepreneurial skills and competences?
    a. Which educational level do you teach?
    - Primary [OctoSkills]
      We recommend that you use OctoSkills, but make sure that your pupils are mature enough to understand questionnaires.
    - Secondary
        - Do you teach your students how to start-up a new venture? [ESP, Entre Intentions, OctoSkills]

      We recommend that you use the Entrepreneurial Skills Pass, but you can also use both Entre Intentions and Octoskills

- Do you focus on entrepreneurial teaching methods and to make your students creative and innovative rather than teaching them how to start new ventures? [OctoSkills]

We recommend that that you use OctoSkills

- Do you want to assess knowledge, skills and attitude of students participating in a mini-company experience(JA Company Programme) ? [ESP]

- The Entrepreneurial Skills Pass is developed to do exactly this

3) Assess which entrepreneurial activities you pupils and students participate in?
   - -We recommend that you use LoopMe
4) Get feedback about how your pupils and students perceive your education?
   - We recommend that you use LoopMe

Measurement Tool for Enterprise Education (MTEE)

The Measurement Tool for Enterprise Education (MTEE) is a short and user-friendly self-evaluation tool that you as a teacher can use to evaluate your development as an entrepreneurial teacher. The tool focuses on five dimensions: 1) Development; 2) Planning; 3) Activities; 4) Pedagogy; 5) Culture. You reply to a short questionnaire (5-10 minutes) and get information about how you score in these five categories. This is compared to the mean average of other teachers who have taken the test so you will find out if you are below or above this which can help you to identify which areas you need to improve.

The answers are automatically recorded so it will be able for you to compare your results over time and assess how you have developed. It can be a good idea to take this test before and after you have participated in teacher development activities in entrepreneurial education, but we also recommend that you take the test on a regular basis, about every sixth month.

You find more information about the teaching tool here:

www.developmentcentre.lut.fi/muut/enterprise/

OctoSkills

You can use OctoSkills in many different ways. The tool is an app and web-based assessment tool which allows you to assess how your students or pupils develop their entrepreneurial self-efficacy, that is, their self-confidence in performing entrepreneurial skills and activities. The focus is mainly on seven entrepreneurial skillsets: 1) Creativity, 2) Planning, 3) Managing Ambiguity, 4) Resource Marshalling, 5) Financial Literacy, 6) Teamwork, and 7) Venture Creation. OctoSkills also allow you to assess how your pupils or students develop regarding career intentions and attitudes towards entrepreneurial activities and self-employment. In addition to this it measures they develop their school engagement, educational motivation and how they perceive your education. You can include additional measures if there are other dimensions you are interested in assessing.

OctoSkills is designed to be used before, during and after your educational initiatives. You will be able to compare how your pupils or students have developed in the dimensions that are measured. The results are presented in spider-web diagrams that are easy to overview. If you have an ongoing educational initiative that you would like to evaluate you can use the survey that is called the “reciprocal test”. The dimensions measured in this survey will be the same, but your pupils or students will in this survey reply to questions about which level they perceived they had before

your educational initiative began and which level they now perceive that they have, after your educational initiative has finished.

OctoSkills also includes a questionnaire that you as a teacher should take. This will help you to assess how you develop as an entrepreneurial teacher. The focus is on teaching methods, school context and teaching self-efficacy in entrepreneurship, that is, your confidence in teaching different entrepreneurial approaches. For more information about OctoSkills, visit www.octoskills.com

The Entrepreneurial Skills Pass (ESP)

The Entrepreneurial Skills Pass makes it possible for students at secondary level (both from academic and vocational schools) to certify the business, economic and financial knowledge and skills they acquired by participating in the JA Company Programme. For teachers it is a full package supporting entrepreneurial learning outcomes, including assessment of students' knowledge and skills in entrepreneurship and new venture creation as well as their confidence in performing entrepreneurial skills and activities.

By participating in the ESP students can take part in a practical entrepreneurial experience (JA Company Programme), assess their entrepreneurial competences as they progress through the year (pre-post self-assessment) and then sit for a final exam which aims at assessing, validating and certifying students' theoretical and factual knowledge (facts, principles, theories and practices related to a field of work or study) as well as their cognitive and practical skills (the ability to apply knowledge and use know-how to complete tasks and solve problems).

The final exam draws questions from a question pool which covers various areas of knowledge that have been taught/trained during the JA Company Programme e.g. general understanding of organisations; main steps and legal requirements; from idea generation to the market; financial resources and budgeting). A prerequisite to taking the test is that JA Company Programme's students have also participated in the self-evaluation survey, a pre and post-test students can use to assess how their entrepreneurial competences (e.g. creativity, perseverance, self-confidence, etc.) have progressed tough out the year. Only the students who participated in the practical entrepreneurial experience, took the self-assessment and correctly answered 70% of final exam's questions will get a certificate issued at international level by relevant organisations such as EUROCHAMBRES and CSR Europe.

You can get more information about how to implement the ESP in your school, by contacting the project team behind ESP. Visit http://entrepreneurialskillspass.eu for more information about the tool.

Entre Intentions

Entre Intentions is a survey that focuses on measuring students' entrepreneurial intentions, their attitudes towards entrepreneurship and self-employment, what their close-ones thinks about entrepreneurship and how confident they are that they can execute and perform entrepreneurial activities. The measures included in the survey have been included in multiple assessment studies. You can use the survey to assess your students' strengths and weaknesses. You can also distribute the survey prior to your educational initiative and then again after you have finished your educational initiative, in order to assess how it has influenced your students. By using the survey guide that can be accessed from the team behind the Entre Innovation tool you will be able to structure the questions included in the survey into specific dimensions. For more information about Entre Innovations, contact: Sanna Joensuu-Salo (sanna.joensuu-salo@seamk.fi)

LoopMe

LoopMe is an App-based evaluation and formative assessment tool. It gives your pupils and students the opportunity to report situations and events which trigger their emotions. They will be are asked to fill out a short form each time they have a positive or negative, enlightening or frustrating educational experience. The form includes questions about which activity they have been performing and how they felt about it. They will be able to send this report to you (anonymously, if they wish), and you will be able to respond to the report. This creates a “loop” of feedback between your students and you.

LoopMe is very useful when teaching entrepreneurship and innovation since a lot of the learning activities will take place outside of your classroom. LoopMe provides an opportunity to stay in contact with and to assist your pupils and students, also when they perform activities outside of the classroom. The “loops” that are created throughout an educational initiative can be used when discussing the experience with your pupils and students. It also gives a good indication about how your pupils or students have experienced your education. For more information about the tool, visit: http://meanalytics.se/wp/?lang=en