

Educational Pyramid Scheme – A Sustainable Way Of Bringing Innovations To School

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Abstract—Full paper. One of the biggest challenges in education is the transfer of innovations and new didactic approaches into the school system. To ensure a high standard of teaching, it is essential that the teachers' expertise, pedagogical content knowledge as well as digital competences are continuously improved by further training. In-service training for teachers is offered in different settings (short-, middle- and long term), with advantages and disadvantages. Two aspects that correlate positively are the costs and the sustainable outcome of these trainings. With these aspects in mind the Educational Pyramid Scheme (EPS) is currently being developed and implemented as part of an Erasmus Plus project. It is an innovative concept that aims at spreading new learning contents and methods in a relatively short time within the school system, with low costs and high effect. It is inspired by the economical pyramid scheme, which is designed to create value through the exploitation of business opportunities. The transaction content of the Educational Pyramid Scheme refers to methods or strategies that are being exchanged, and to the resources and capabilities that are required to enable the exchange. According to a train-the-trainer principle, teachers and pupils will be qualified to be trainers, who then spread their knowledge and skills to people in their school and beyond. The EPS contains three different functions or roles: multipliers (teachers and scientists), mentors (teachers) and tutors (pupils). The motivation to participate is maintained with a benefit system adapted for each target group. The training of target groups follows high qualitative standards and therefore presents different phases: input, practical phase and reflection. This paper describes the development of the EPS and its first implementation in the framework of the Austrian mandatory curriculum "Basic Digital Education" including computational thinking and programming. It presents some qualitative results gained so far from interviews and observation, which are satisfactory and deliver good arguments for the further implementation of the EPS.

Index Terms—teacher training, pyramid scheme, train the trainer, professional development, modeling

I. INTRODUCTION

Nowadays, the education system is changing at a more rapid pace than in previous centuries. Reforms of curriculum, teaching practices and assessment attempt to prepare children for the high demands of the 21st century. The challenge of the

21st century teacher is to continuously develop new skills and practices that are needed to successfully teach in a technology-driven environment and that prepare the students for the fast-changing future. The way educators teach, shape their students and has a major influence on whether they can succeed in the globalizing world outside the classroom. To support educators to tackle these challenges and keep pace with time, further training is of utmost importance.

In Austria, professional support for teachers through a broad range of in-service trainings is offered in different settings (short- middle- and long term). However, despite the growing importance of developing new teaching skills and offering effective professional support, impact research in Austria has not yet reached the status it should have and must be further elaborated. According to the 2018 National Report on Education for Austria, published by the Federal Institute of Educational Research (BIFIE), there is still little research in the field of professional development. Moreover, it has hardly been systematically evaluated and is therefore unsatisfactory [1].

Whether professional development has a positive effect on the students strongly depends on the training opportunities the teachers receive. Unfortunately, despite the training offers, still many teachers do not change their teaching behavior for several reasons. A 2019 study of the German association for the promotion of teacher training (DVLfB) [2] analyzes teacher training in Germany and comes to the conclusion that the organization of teacher training is an essential reason why the knowledge acquired does not have a long-term impact on teacher's behavior. They claim that the majority of trainings offered are one-time courses with no post-processing or follow-up courses. To gain sustainable effects, however, follow-up trainings need to be arranged sequentially and should contain the following aspects: input and trial phase, reflection and exchange with colleagues. The study also reveals that one of the major problems in implementing follow-up trainings is that professional development in Germany, as in many other

countries, is underfinanced.

The Educational Pyramid Scheme (EPS) presents an innovative method of professional development that has the potential to eliminate negative aspects such as financial issues or low training outcomes. With the EPS, knowledge and innovations are passed on in a pyramid system and thus reach a large target group in a short and cost-effective way. The involvement of different stakeholders (teachers, pupils, researchers and students) and the use of effective didactic methods, ensure high quality and sustainable training. The EPS was developed in the course of the Erasmus+ project “Modeling at School” and is currently being implemented in different settings. This paper outlines the theoretical concept of the EPS and presents the results of the first pilot phase conducted in the Erasmus+ Project.

II. RELATED WORK

In our fast-paced world, regular teacher training is becoming increasingly important. Nevertheless, there is some disagreement regarding the effect of teacher professional development on the quality of teaching and students’ learning outcomes. In a meta study, John Hattie [3] collects and analyses many previous studies in education of English-speaking countries, where he compares the impact of several aspects on student’s achievement, one of them being the contributions of the teacher. He found out, that professional development has a medium to strong effect on student’s achievement ($d=0.62$). However, whether it really has an effect on students’ learning outcomes very much depends on the quality of the training. The 2017 report on effective teacher professional development published by the American Learning Policy Institute [4] outlines seven features of effective professional development that lead to changes in teacher behavior and improves student learning outcomes: focus on specific content, incorporation of active learning, support of collaboration, use of effective practice models, provision of coaching and expert support, offer of feedback and lastly, sustainable duration, which includes time to learn, practice, implement and reflect.

If it is about researching the quality of training or knowledge transfer, attention should be paid to concepts that in other fields have already been applied successfully. The transfer of knowledge can also be compared with the trade of goods, which is why an orientation towards successful business models from economy can be considered. Education efforts could benefit from understanding commercial contexts and could concentrate on the content, i.e. the educational good, without economic pressure. A business model, considered from the perspective of transaction and value creation,

“[...] depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities. Transaction content refers to the goods or information that are being exchanged, and to the resources and capabilities that are required to enable the exchange. Transaction structure refers to the parties that participate in the exchange and the ways in which these

parties are linked. Transaction structure also includes the order in which exchanges take place (i.e., their sequencing), and the adopted exchange mechanism for enabling transactions. [...] Finally, transaction governance refers to the ways in which flows of information, resources, and goods are controlled by the relevant parties. [5]”

One model that seems particularly interesting for the education sector in this context is multi-level marketing (MLM), which is geared towards networked sales through cooperation. The MLM concept dates back to the early 1950s and started in the United States of America. As a Direct Selling-Model, it is a “*face-to-face selling away from a fixed retail location* [6]”. A network structure provides for a customer to become a reseller and thus, at the next level a recruiter, to further promote sales. The innovative remuneration in the form of a provision and bonus system, based not only on own sales but also on the income of the downline sales partners, has proven to be very effective and profitable [7]. Money is earned from own sales, but also as a percentage of the income of distributors who have been brought into the program.

As the denomination implies, the MLM system is based on the principle of creating a multi-level structure and is therefore often confused with illegal distribution systems such as snowball or pyramid games, where the focus is on recruiting people rather than selling products [8]. In our society, MLM organizations are often negatively evaluated due to these legal demarcation problems and ethical aspects, which is why it can often be observed that efforts are made to build up an internal “social life” [9]. An essential prerequisite for the functioning of these often complex organizational structures is therefore the motivation of sales partners, which is to be ensured by organizing meetings and offering material incentives and symbolic recognition. Systems based on the MLM model benefit above all from the great potential for steady growth and the fact that new markets can be entered quickly and easily [9] at low entry and operating cost. Good communication and interpersonal skills and the talent to work in or support teams are required.

If the advantages of this multi-level sales model are to be transferred to the education sector, the main condition for success will be to maintain social interaction through regular meetings and provide incentives through material and symbolic recognition. A steady growth would be expressed by a rapid spread and establishment of educational contents and methods.

A very complementary model in the field of education is the cascade training, which is a “train the trainer” approach where a first generation of trainers receive training and deliver the specific content to the next generation of trainers. This process can be repeated again and again [10]. The cascade model is already widely spread across the world in teacher professional development, especially in developing countries due to its cost effectiveness and the chance to reach a large group in a relatively short time [11], [12], [13]. Typically, selected teachers of an institution receive training and disseminate the knowledge

in their schools by providing training for other colleagues. However, besides the benefits of being very efficient and cost effective, several studies reveal weaknesses of this method. One major limitation is that depending on the level of teaching competency, the quality of the training can decrease or content may dilute [13]. Also Bett [11] points out that important information gets misinterpreted or dilutes as it descends the cascade. Furthermore, the cascade system often provides little continuous support with the consequence that there is often no lasting behavioral change and practice and therefore, no sustainable improvement in the quality of teaching [13]. Also Robinson [14] claims that a major disadvantage of the cascade model is that it offers little follow-up support structures, which has negative effects on the long-term implementation. In their research study, Dichaba and Mokhele [15] collected quantitative data of 103 teachers of the North West Province of South Africa and found out that a considerable number of teachers do not feel comfortable sharing the knowledge to the fellow colleagues.

Sparked by the multi-level sales model and cascade training, the EPS aims at spreading knowledge and innovations fast and cost-effectively from top to bottom. Current developments show that globalisation, the widespread use of information and communication technologies and the associated decline in transaction costs have far-reaching effects on society, the economy and education. New patterns of value creation can be summarised under the term "bottom-up economy", which is increasingly characterised by the merging of production and consumption and by distributed structures and processes. Thus, the process of transforming the supply model into a "co-creation model" [16] can be observed in both the economy and education. The EPS model takes these developments into account and integrates educational practice and innovation also from below.

Taking into account the various theories and aspects shown, we developed an innovative training model. The background and essential components of the EPS are described in detail in the following section.

III. THE EDUCATIONAL PYRAMID SCHEME

A. The Background

The Erasmus+ Project "Modeling at School (MaS)" (2018-2021) has the aim to spread the innovation of using the concept of modeling across all subjects and school levels. The MaS project focuses on modeling with diagrams that derive from the field of computer science. Modeling is a fundamental concept in computer science [17], [18] and serves as a useful instrument in e.g. the software development process. Ira Diethelm [19] even points out the importance of modeling by calling it the "mother tongue" of computer science. The MaS stakeholders make use of this effective modeling strategy in computer science and transferred it to the field of education. The use of these diagrams is a creative and effective teaching and learning strategy for every subject and school level with the benefits that it (1) fosters computational thinking skills and (2) digital literacy. In the MaS project, a group of experts from

Austria, Finland and Spain share their expertise across borders with the aim to bring the innovation of modeling to their local schools and implement it sustainably. In order to guarantee a widespread professional development and dissemination, the stakeholders developed and make use of the EPS.

B. The Educational Pyramid Scheme

One of the biggest challenges is to effectively disseminate and boost innovations with the result that teachers adopt and utilize the newly taught skills in the classroom. To break through this obstacle, the stakeholders of the MaS project developed the EPS, which is sparked by the well-known pyramid concept from the field of commerce. The negative criticism inherent in the pyramid system in the economic context is to be consciously transformed into something positive at EPS. When knowledge is passed on, both, those to whom new knowledge is imparted and those who act as mediators, benefit. Teaching strengthens and extends one's own knowledge. Those who are taught modeling as a learning strategy benefit from it by gaining IT knowledge and by having an effective learning strategy at hand. In turn, they pass on their newly acquired knowledge, consolidate their own skills and help others. In the economic snowball system only the top hierarchies win, with EPS everyone wins equally. The essential elements of the EPS are described in more detail below.

The EPS concept comprises five main pillars:

- focus on different target groups and collaboration
- establishment of a benefit system
- provision of continuous support
- didactical methods for sustainable learning
- mandatory implementation in the own school setting

1) *Target Groups and Roles:* An innovation of the EPS is that the training not only involves teachers, but also other stakeholders, such as researchers, students of teacher education and pupils who perform one of the following three roles throughout the training process: multiplier, mentor or tutor.

As the name already reveals, the multipliers have the task to spread the innovation within their institution. Furthermore, they serve as the first contact person within the target institution and span the bridge between them and the training establishment, which is in our case the university. The multipliers are the first-level trainees and disseminate the knowledge to the second level of trainees - the mentors and/or tutors. However, the main task of the multipliers is to serve as coordinators and promoters of the new content. It is important that the multipliers have an overview of the activities at their own school. If there are difficulties in implementation, problems with motivation or a slowdown in the dissemination of knowledge, the multipliers should react as quickly as possible. In addition, they are in close cooperation with and receive continuous support of the training establishment. The multipliers do not necessarily have to be teachers. They can also be researchers or students of teacher education who function as multipliers within the own institution or a school.

The mentors are the second-level trainees of the pyramid. They receive training and together with the tutors, they implement the new knowledge gained in the classroom. Furthermore, there is a strong collaboration between the mentors. Mentors are teachers or students who work at the school.

The tutors are pupils who also receive training by the multiplier and subsequently, in collaboration with the mentor, implement the new skills in the classroom. They are the contact persons for the fellow pupils and support them in the learning process.

Title	Tasks	Benefit
Multipliers (teachers, students, researchers) 	Mentors who are also active in the dissemination of modeling as a teaching and learning strategy. Contact persons for cooperation within the school as well as between school and university.	Training units/ ECTS credits, additional training "basic digital education", promotion of gifted pupils, knowledge exchange, creation of materials
Mentors (teachers, students) 	Together with tutors, mentors implement modeling in the classroom. Cooperation between the mentors.	Training units/ ECTS credits, additional training "basic digital education", promotion of gifted pupils, knowledge exchange, creation of materials
Tutors (pupils) 	Tutors together with mentors implement modeling in the classroom. Support other students.	Extra points for participation, promotion of gifted pupils, "basic digital education" certificate

Fig. 1. Educational Pyramid Scheme

2) *The Benefit System:* One of the decisive parameters in the long-term implementation of new behaviors or new knowledge is motivation. The most important engine by far is high intrinsic motivation. A high level of intrinsic motivation can be achieved by making the content conveyed meaningful and exciting for the participants. In the MaS project modeling as teaching and learning strategy is something new and practicable. Many participants are familiar with graphic display methods (e.g. mind maps), which ties in with existing knowledge or learning strategies. It is known from learning psychology that content is better absorbed if it builds on existing patterns. What is new about the diagrams used in the MaS project is that they come from computer science. In addition to teaching a learning strategy, aspects of Basic Digital Education can also be learned. In addition to the positive effect of imparting IT knowledge, the main motivator is that the learning strategy is effective and relatively easy to use. Something that works well and makes learning easier is readily accepted by both pupils and teachers and is also used in the long term. In addition to intrinsic motivation, the EPS offers a target-group-specific benefit system to strengthen extrinsic motivation (see 1). Both multipliers and mentors receive training units or ECTS credits for participating in the EPS. For some teachers in Austria, advanced in-service training is mandatory, so it is attractive to participate in this program. In addition to the training units, the teachers also cover the implementation of Basic Digital Education, which is mandatory in Austria. By participating in

the project, teachers have an extensive collection of materials at their disposal. Furthermore, teachers can also publish their own teaching units in this online collection. This constantly expands the pool of materials. By working with the pupils, teachers can particularly support gifted pupils. In addition, they teach the pupils skills that are in great demand in today's working world. The pupils' benefit system can be set up very individually by the school. For example, pupils can get positive participation grades, be mentioned in annual reports or on the school's website. Every tutor receives a confirmation of participation from the university, which can be presented in future applications.

3) *Continuous Support:* Ongoing stakeholder support is essential for the success of EPS. Just as the task of the multipliers is to "keep the EPS running in their school", it is important as project manager to have an overview of the activities in the individual partner schools. The training establishment's role is to offer help with questions or difficulties, which quickly and easily can be implemented through online consultations. Multipliers, but also mentors or tutors can report on their experiences in this consultation hour and clarify open questions. If necessary, on-site support, e.g. by organizing a topic day in cooperation with multiplier at the school is offered. In addition to this low-threshold support, also a proactive approach to multipliers can take place. Multipliers are contacted at certain intervals to conduct short focus interviews on the current status of implementation.

4) *Didactic Methods for Sustainable Learning:* Another core element of the EPS is the use of effective and brain-based learning techniques. Guskey [20] formulated three types of participant learning goals: Cognitive (knowledge and understanding), Psychomotor (skills and behaviours) and Affective (attitudes and beliefs). Skills and abilities are to be sustainably achieved on all three levels with the EPS. The heart of the EPS is the transfer of knowledge. According to the train-the-trainer-principle, the individual stakeholders pass on their knowledge by training other people who in turn become trainers themselves and again spread their knowledge. Besides this approach to educate other trainers, another successful practice is being fostered with the EPS: peer teaching or peer tutoring, where tutor pupils who become tutors have the task to slip into the role of the teacher and teach their peers. Sharing knowledge and instructing others provide a deeper understanding of the content. An essential element is the creation of your own (learning) materials. The participants acquire skills in the field of Basic Digital Education (which is the content of the knowledge passed on in the MaS project) and also learn to pass it on to others (peer teaching). By using modeling (informatic content) as a learning strategy, negative attitudes or resentments towards IT can often be eliminated.

5) *Mandatory Implementation in the School Setting:* Another crucial pillar of the EPS is the immediate and mandatory implementation of the gained knowledge into the school setting. In comparison to lecture-based training, immediate design and implementation of new strategies lead to a direct connection to the teachers' students [4]. Within the EPS

training, participants create their own material that is immediately implemented in the practical phase. This process is accompanied by feedback, support and reflection. The created material will then be shared with others in an online material collection.

C. The Implementation

Participation in the MaS project is open to all schools. Schools are informed about the offer through various positions (universities of education, existing school contacts etc.). A cooperation agreement for two years was signed by interested schools, of which there are around five in each partner country. The content training follows the concept of blended learning, where online and face-to-face elements are combined. The implementation of the EPS in the cooperation schools takes place in different steps.

1) *Training multipliers:* In a kick-off event at the training establishment, the multipliers are made familiar with the content. The different diagram types and their use as a learning strategy are presented in a workshop. One focus in conveying the content is that the participants immediately apply the knowledge they have acquired in their subjects. Another important point in this workshop is the EPS. The concept of the EPS is explained and is followed by a discussion about the concrete implementation in their own school. Each participant elaborates an action plan for implementation.

2) *Implementation in school:* Since the participants have different knowledge in modeling as a learning strategy, two ways of implementation are offered. Participants with already good knowledge and prior experience in modeling as a learning strategy disseminate the knowledge independently in their school. They recruit mentors and tutors and organize meetings and internal trainings. Multipliers with little experience are advised to organize a “modeling theme day” at the beginning of the implementation phase. The aim is to make the topic known to a large audience at school. The multipliers receive assistance from the project staff in the organisation and implementation of the event. For all target groups (multipliers, mentors, tutors) online training is available to impart knowledge. Each participant must complete this online training and create materials that are tested in their own lessons. If necessary, they will be supported by multipliers or staff from the MaS project. The role of the multipliers is very important. They are responsible for ensuring that the knowledge is spread more widely in their school. For this, also mentors and tutors have to recruit again other mentors and tutors. The further concrete implementation depends on the general conditions of each school. It is important that the project is linked to existing offers. This makes it easier to guarantee sustainable implementation. For example, one partner school already offers an additional course entitled “Learning to Learn”, which provides the ideal surrounding to integrate modeling as a learning strategy. The aim of the multiplier in this school is to integrate it in this offer to guarantee that a large number of pupils is reached. These

pupils can in turn act as tutors and promote the dissemination of knowledge.

3) *Reflection:* The MaS project will end in August 2021. Therefore, the partner schools are asked to participate in a final evaluation. A multiplier event is organized to promote networking between the partner schools. Regardless of the project, it is intended that schools continue to use modeling as a learning strategy.

IV. METHODS & RESULTS

A. Pilot Phase

In the summer semester 2019, the EPS was tested for the first time. Eleven student tutors took part in the pilot phase, four of whom were male. The tutors were recruited through other programs of the JKU COOL Lab [21], and were largely gifted. In the pilot phase, tutors were deliberately used because we suspected that this target group would be the most challenging. Our goal was to find out what support the tutors in particular need to implement the EPS. Teachers already have teaching experience and can quickly and easily implement new content in the classroom. For pupils, on the other hand, it is often the first time that they stand in front of a class and hold a workshop. The training of the participants consisted of five parts:

1) *Individual theoretical introduction:* Since the majority of the participants were highly gifted and, in addition, they already had experience with modeling in other JKU COOL Lab events, they were initially given various online materials and step-by-step instructions for modeling for self-study.

2) *Accompanied practical experience:* The first face-to-face appointment took place at the JKU Linz. At a larger event, the tutors, together with teaching students, supervised individual modeling stations. They explained individual diagrams and various possible uses of modeling in a non-informatic setting to interested pupils and teachers.

3) *Modeling workshop:* The next face-to-face meeting was a modeling workshop in which the tutors received in-depth information about modeling as a teaching and learning strategy as well as instructions and support for the following practical phase at school. The three-hour workshop was structured in three phases: modeling as a teaching-learning strategy, (neuro-)didactic tips and tricks for the practical phase and creating an action plan for the practical phase.

4) *Practical phase:* The tutors had to motivate at least one teacher in their school to participate in the project. After the project was approved by the school principal, the preparations could start. The tutors organized a preliminary meeting with the teacher (mentor) to clarify the topic on which the lesson sequence should be held. The aim, duration and scope of the modeling workshop in the specific subject were discussed. After all the key data had been clarified, the tutors began to prepare the workshop together with the mentors. Two diagrams were selected to match the topic (e.g. activity diagram to show grammar rules in English). For the workshop, between one and two exercises were prepared for the pupils. The workshop was primarily carried out by the tutors, but with the support of the

mentor. The tutors introduced modeling as a learning strategy to a class. A relevant aspect was that the pupils should try out the knowledge they had learned themselves. At the end of the practical phase, the tutors were asked to forward diagrams from the teaching unit to the JKU COOL Lab and to reflect on their experiences.

5) *Final presentation and reflection:* At the last face-to-face appointment, the tutors presented their teaching sequences to the whole group. Following the presentations, a focus interview was conducted in which positive and negative aspects of the tutor training were reflected.

During the entire tutor training, the tutors were supervised by employees of the MaS project. The tutors were supported at all times with questions of content as well as organizational challenges.

B. Results

Two surveys were carried out during the pilot phase. The first survey was scheduled after the accompanied practical experience. The tutors had to write a reflection on this first practical experience (N=8). Based on these results, content was determined for the subsequent training, the modeling workshop. The results showed that individual diagrams (e.g. object diagram) should be discussed more detailed and information about didactic methods is desired. The focus of the modeling workshop was on these topics. After the practical phase in school, the second survey, a focus interview, was conducted. During this appointment, all tutors were asked to give a short presentation about their practical phase, to hand over the collected materials (diagrams created by students) and to participate in a focus interview. The results of the focus interview (N=11) can be summarized as follows:

1) *Presented content:* Decisive for success is your own good preparation. It is imperative that you are very familiar with the topic. In this case, the learning strategy modeling should already be applied by the tutors. The tutors agreed that it makes more sense to present only one or a maximum of two diagrams. This enables more targeted preparation and the tutors are not overwhelmed at the workshop. In sum, the own enthusiasm and knowledge for the topic is very important whether the students accept it.

2) *Didactic aspects:* For almost all tutors, it was the first time that they stood in front of a class and carried out a teaching sequence. Even though we dealt with didactic aspects in the modeling workshop, the tutors wanted more support, especially in this area. Topics such as class management, dealing with disturbances and diverse didactic methods were addressed. Overall, however, all of the tutors rated the experience gained as very valuable. Almost all expressed interest in continuing to participate in the project.

3) *Framework:* Overall, the collaboration with the mentors was rated as very positive. It was perceived as difficult that the time resources of the teachers were very limited. Meetings had to be held during breaks or free periods of the teachers. The possibilities to accommodate external projects within the school system are often limited. The support of the school

principals was seen as very important. In this way, framework conditions can be created to guarantee effective cooperation. The tutors found it difficult to inform the principals, teachers and parents about the project. They would have liked more support in this regard. The decision in which classes the tutors carry out the workshop was made very individually. Classes with younger students were mostly chosen, but workshops were also held in one's own class. The tutors preferred the younger students. None of the tutors held a workshop in a class higher than their own school level.

Overall, it can be said that the feedback from the tutors about this pilot phase was very positive. They were able to gain valuable experience and develop their own skills and abilities.

V. CONCLUSION & OUTLOOK

The Educational Pyramid Scheme presented in this article is a novel and effective training model with the aim to spread innovations (e.g. CS modeling as interdisciplinary learning tool) rapidly and anchor them sustainably. Three functions are described that people can take on in the EPS: multipliers, mentors and tutors. The EPS itself builds on proven didactic concepts that positively influence and facilitate the dissemination of knowledge. The core elements of the EPS are based on effective strategies that lead to successful professional training. These are collaboration of different target groups, motivation, support, active learning and effective didactic methods. Results of the pilot phase confirm the validity of the theoretical assumptions. It is crucial for the success of the EPS that the multiplier creates optimal framework conditions for the implementation. The resources of each school must be analyzed and synergies optimally used. Tutors in particular must be supported by mentors or multipliers in the didactic implementation. Tutors are the target group with the least experience in teaching. In addition, motivation is one of the key elements that lead to successful implementation. It is vitally important that stakeholders in the EPS are enthusiastic about the content they have to deliver to spark the interest of the others. Lastly, the target groups must master the topic and have already gained their own practical experience in the use of modeling as a teaching and learning strategy. Currently, the EPS is being implemented in all the MaS partner schools in three countries (Austria, Spain, Finland). Interim results of this phase confirm the first positive results presented in this article. The findings gained until now have revealed that the EPS has great potential for spreading knowledge and skills effectively and sustainably into the school system.

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