



**DEMETRA - Development of a Methodological Training for Company Instructors Providing Work-Based Trainings in the Plastics and Related Industrial Sectors 2017-01-HU01-KA202-035951**

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# DEMETRA PROJECT: EXPERIENCES AND CHALLENGES

## FOCUS GROUP FINDINGS ACROSS HUNGARY, ROMANIA AND SLOVAKIA

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## 1. Survey objectives and methodology

The aim of the present survey is to provide a picture of gamification experiences of mentors and students involved in the DEMETRA project<sup>1</sup>. The main objective of the research is to gain information from both target groups regarding gamification methods that were used by instructors during teaching, highlighting the experiences, expectations, challenges and results of the methods used.

The traditional teaching methods are based on oral communication (mainly by the instructor), lecture, demonstration, examples. Students are recipients of information and they do not ask many questions, they are not active. In contrast, the use of gamification methods assumes greater student activity and promotes learning by playing.

### 1.1. *The survey instruments*

The survey is based on qualitative analysis (focus group interviews) and the survey design followed the same structure in all the three countries that participated in the project (Hungary, Romania, Slovakia).

By using the research instruments we aimed to explore:

- ✓ The content and form of teaching with gamification methods;
- ✓ On one hand the expectations of mentors and students and on the other hand their satisfaction concerning expectations and time spent;
- ✓ The role of a mentor/student;
- ✓ The advancement and result of teaching;

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<sup>1</sup> DEMETRA - Development of a Methodological Training for Company Instructors Providing Work-Based Trainings in the Plastics and Related Industrial Sectors 2017-01-HU01-KA202-035951 - project aims to increase the quality of the mentoring component within an apprenticeship program and to support the students from the Generation Z, by exploiting the knowledge and experience of experts in vocational training. The project has launched in November 2017 by support of Erasmus +.

*Goal of the project:* The DEMETRA project will work out a work-based training for corporate mentors/instructors in plastics and related industry to support them to technically be able to adapt to the rapidly changing challenges in this industrial sector. In addition, a Methodological Guide will be developed containing gamification elements to be brought into the daily teaching routine, in order to increase the motivation of generation Z in vocational training.

- ✓ Challenges.

## 1.2. Participants' sample

The survey covers two different target groups: mentors (employees in various organisations) and students from three countries: Hungary, Romania and Slovakia. In total 23 mentors (10 from Hungary, 8 from Romania, 5 from Slovakia) and 113 students (50 from Hungary, 18 from Romania, 45 from Slovakia) participated in the focus groups and shared their opinion about gamification methods.

Table 1. The sample by respondent type and by country

	Hungary	Romania	Slovakia	Total
Mentors	10	8	7	25
Students	50	18	45	113
Total	60	26	50	136

The specializations of the students are the following:

1. Hungary:

- Electronics;
- Information technology;
- Chemical industry;
- Engineering.

2. Romania

- Electrician and electronist technician;
- Locksmith, welder, technician, electromechanics.

3. Slovakia

- Mechanician of machines and tools;
- Programming of machine tools;
- Mechanician – mechatronic;
- Mechanician – setuper;
- Mechanician – electrical engineering.

Thus, the mentors also came from these areas, and the topics they taught (using gamification methods) also came out of these subjects. Given the specific of the internship programs, the sample presents a rather large difference between the number of females and the males included. As shown in *Table 2*, 78 percent of mentors included in the project are male and 22 percent are female. This unbalanced ratio applied especially for the group of the students where 96 percent are male and only 4 percent female.

Table 2. The gender of the sample

	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
<b>Mentors</b>	<b>18</b>	<b>78</b>	<b>5</b>	<b>22</b>	<b>23</b>	<b>100</b>
<b>Students</b>	<b>109</b>	<b>96</b>	<b>4</b>	<b>4</b>	<b>113</b>	<b>100</b>

### 1.3. Main topics and questions

Table 3 summarizes the main topics and questions asked during the focus groups:

Table 3. Main topics and questions

Main topic	Questions and topics for mentors	Questions for students
<b>Content of training aimed at gamification methods and its utilization in teaching/ Content and form of teaching with gamification methods</b>	<p>Training signification for myself as an instructor</p> <p>Presented information during the training</p> <p>The training included various supporting formats and materials</p> <p>The training improved my knowledge and skills</p> <p>Utilisation of examples and games in praxis</p>	<p>Is the content of teaching after application of gamification methods clearer, more comprehensible, easier to understand new information?</p> <p>Is the form of teaching more interesting for you? Is it better that you are more active during the teaching class? How do you see the chance to compete during teaching? Do you find it better that you can modify the teaching process?</p>
<b>Expectations – satisfaction concerning expectations and time spent</b>	<p>Fulfilment of expectations</p> <p>Level of difficulty of the training</p> <p>Adequate pace of the training (slow- adequate - too fast)</p> <p>Enough time for this specific topic of the training</p>	<p>What do you think about learning by playing “games”? (Flip chart with paper, crossword, creation of own products, playing boats, playing as in a research institute, videos, etc.)</p> <p>Is this above mentioned a better way of learning? Do you like it? Do you need to prepare less or more for the class? Is it easier or more complicated? Is this type of learning more time consuming?</p>

Main topic	Questions and topics for mentors	Questions for students
<p><b>Role of a mentor as a teacher applying new methods in teaching/ Role of a student as a recipient of new methods in teaching</b></p>	<p>Please define or try to sum up how you personally understand the meaning of “teaching by using the gamification elements”?</p> <p>What is the main role of a mentor? What is the value of teaching that uses gamification methods? Had it improved your self confidence in any way? Had the application of gamification influenced your role of an instructor? How did you feel when using the gamification methods in teaching?</p> <p>What knowledge, competence or skills you feel that you should have or improve as an instructor when applying the gamification methods in your teaching process in the future?</p> <p>Do you see any influence of application of gamification elements in teaching on your own motivation to share your knowledge with students?</p>	<p>How did you feel during the teaching with application of new gamified methods?</p> <p>What was the impact on your interest, motivation, utilisation, applicability, actual trendy methods?</p> <p>What about the atmosphere in the class?</p> <p>Is this type of education more motivating for you? Does it make you more in the topic? Would you like to know more about the teaching topic when presented by a game?</p>
<p><b>Advancement and result of teaching, influence of gamification</b></p>	<p>Have you noticed any progress in teaching with application of gamification methods?</p> <p>Have you noticed faster or easier understanding of the content on teaching? And what about the motivation and interest of students –has it changed? Increased? Do students give more questions? Do they feel taken in the topic? Is it easier to have their full concentration for a longer period of time?</p> <p>Do gamification methods have influence on students’ results? – Such as better attendance, cooperation, competitiveness, better remembering of technical information, increase of own activity during teaching, more interest in the topic, etc.</p>	<p>Does this type of teaching motivate you to be more open during the class? Or to be able to create something by your own? Does it support your motivation to cooperate in the group? Does it help you to improve faster in this specific teaching subject?</p> <p>Does it influence your interest in the topic, subject, when using games during teaching?</p> <p>Do you think that reached teaching results can last longer and be more stable? (as knowledge, skills, or interest in the topic)</p>
<p><b>Challenges and future steps</b></p>	<p>Have the new teaching method using gamification elements had an impact on students needs? What challenges do you see when applying teaching programs using gamification methods? What are the limits of such methods? What challenges do you see for the gamification elements in teaching?</p>	<p>Would you like to be taught by these gamified methods in specific subjects or in specific parts of study subjects? Which ones would you prefer?</p>

## 2. Findings

In order to understand the effects of gamification during teaching, five topics will be discussed: (1) content of training and teaching, (2) expectations of mentors and students, (3) role of a mentor and student, (4) advancement and result of teaching, (5) challenges and future steps. Below we will present the opinion of **23 mentors** and **113 students**, and in some cases we will emphasize the differences between the countries regarding to the effects of these methods.

### 2.1. *Content of training. Content and form of teaching*

In order to apply gamification methods in teaching, the mentors had the chance to participate in a training, which on one hand introduced them in gamification methods and on the other hand helped to develop other skills. Before the training, there was a one-day presentation where the methodology was presented.

The feedbacks after the training were positive in all the three countries, although in some cases the future mentors also mentioned a few difficulties, mainly caused by the novelty. In the same time in some cases they felt that their activity was limited due to lack of knowledge of foreign language. One of the mentors highlights that

*„Education was completely comprehensible to me. There were some difficulties in the application, which I did not think about in advance, but the supervision helped a lot“  
(Hungarian mentor)*

The mentors agreed that the training had several positive effects such as improving the knowledge and abilities and they have also learned how to prepare gamified methods fitting to their teaching subjects. The new information gave them some extra motivation and they believe that the novelties also widened their horizons.

The use of new tasks provoked greater activity than expected in the students, mobilized the competitive spirit in them, and helped it develop. In some cases, the students which are used to the traditional teaching can find the gamification method *“a little strange.”* at the beginning, but after that almost all of them found it interesting and useful. They find it

positive that thanks to these methods they “*could remember things more quickly*” and “*could focus better*”. They also mention that gamification methods kept them more active and “*knowledge stayed in their head for a longer time*”. In this section, the Romanian students focused exclusively on the positives. Although in case of the Hungarian and Slovak students positive evaluations were dominant, some of them wanted also to point out a few negative aspects:

*“It was quite hard for me; I haven’t had any experience with this type of learning in comparison to my classmates. I am not sure if I understood it correctly.” (Slovak student)*

*“Not interesting way of teaching for me”. (Slovak student)*

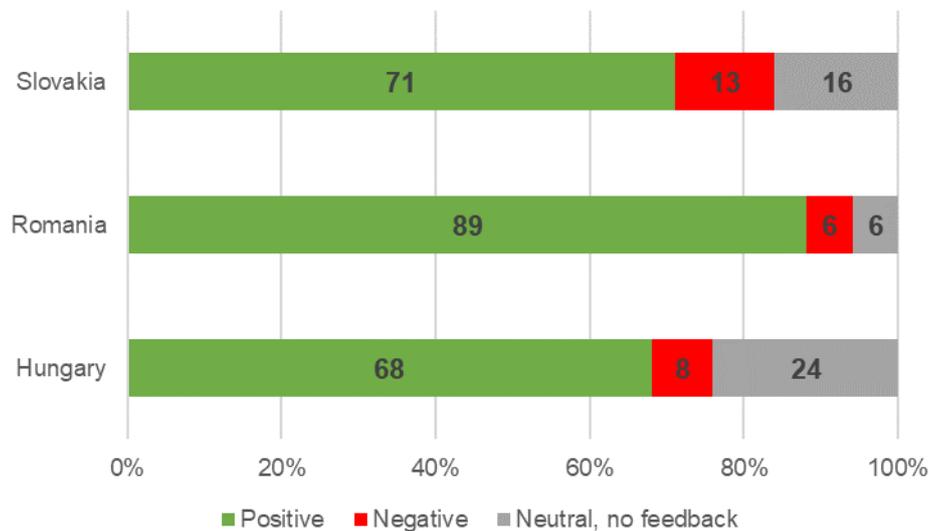
*“We wanted to get in a fight for a pillow, I think it was childish.” (Hungarian student)*

*“It caused a lot of conflict and competition.” (Hungarian student)*

It can be seen that the idea of competition is perceived differently among students. Although for most of them this means an extra motivation (“*there was spirit in the task, and there was a reason to fight for the result, and it was good to compete*“, „*we could win pillows, which was exciting, and the race was continuous for the first 3 places*“), there are some cases when they identify it as a conflict.

As one can see on Figure 1, most of the students gave a positive feedback (Slovakia 71 percent, Romania 89 percent, Hungary 68 percent) after the lessons. In all three cases there were students who could not decide the impact of these methods and gave a neutral answer or did not answer (Slovakia 16 percent, Romania 6 percent, Hungary 24 percent). Slovakian students were the less satisfied: 13 percent of them gave a negative feedback. This proportion is 6 percent in case of the Romanian and 8 percent in case of the Hungarian students.

Figure 1. Feedback of students (%)\*



\*negative feedback does not mean that all the answers were negative

## 2.2. *Expectations of mentors and students*

The mentors agreed that the training was more than useful as they could use the newly learned things immediately. For most of them the training was not difficult and it fully met their expectations, “*the speed of the training was completely adequate, and sufficient time was available*“. One of the Hungarian mentors mentions that it “*could have had wider spectrum*“. Some of Romanian and Slovak mentors feel that the training should be longer and some consider that it will take them more time to adapt the new knowledge in order to be fully successful with their own performance in front of students.

The students also feel that the “new” methods met their expectations, and most of them are absolutely positive about learning by playing “games”:

*“These methods were phenomenal.” (Hungarian student)*

*“I couldn't name one method that wasn't good.” (Hungarian student)*

*“The game was very enjoyable, we had the chance to win PEMÜ gifts. It would be great to have a program like this once a month.” (Hungarian student)*

*“Class was a pleasure because everything was a competition: time passes by very quickly when you play.” (Romanian student)*

*“My level of satisfaction was good. I would like that all my classes would be taught by this method.” (Romanian student)*

*“The taught subject is easier to remember.” (Slovak student)*

The responses outline that students’ motivation increases and they are looking forward to future “games”. It is interesting that they find it a *“big advantage that they could start solving the task in different order“*. This highlights the rigidity of traditional teaching: it is already positive for the students that they can decide on the order of the tasks. Analyzing the answers, we can notice that “games” like Kahoot, crosswords, word search and “installation” became very popular among students.

Among Slovak students there is no consensus on the use of videos. Most of them find the videos useful (*“I watched the video to understand better the taught subject“, „I used to watch such videos with info about programming at home, I find it very useful, especially when I was a beginner“*), while others would rather ignore them (*“in personal contact I can easier absorb information about the study subject than via YouTube videos“, “I like learning from text books more, I can better select information and memorize it“*).

Further criticism is expressed by two Slovak students about the mentor’s preparedness: *“this method requires better preparation of the trainer“, „required longer preparation from the trainer side, especially for the first class“*.

### **2.3. Role of a mentor. Role of a student**

Applying what they learned during the training made the mentors curious about how much they could apply this knowledge and how well it would engage the students. They first tested the tools and exercises with each other. They were motivated to try something new, especially when the first feedback came from students who liked some elements very much.

Analyzing the answers we come to the conclusion that even mentors need some novelty to become more motivated:

*“When I used the gamification methods, I felt like a child, eager to find out the outcome of the game, to find out what each one learned.” (Romanian mentor)*

*“The role of gamification is to transform abstract information into a game. I think that gamification makes age differences disappear, the students cooperate more.” (Romanian mentor)*

*“I belong to the older generation of teachers. When the computer came into the children's lives, I had to learn it too. I feel that in today's modern world, when everything is based on technology, it is necessary to introduce new methods. Today's youth needs this, we can only have their attention if we can show them something new and interesting.” (Hungarian mentor)*

Some of the mentors consider it hard to catch the attention of young people and it can be challenging to show them constantly new things. By using gamification methods they succeed in maintaining the students' attention and this way even mentors' self-confidence increases. Slovak mentors added that they need more time and to gain more skills in realisation of practical education with gamification elements.

Students' responses confirmed teachers' view that gamification methods make it easier to maintain their interest. They appreciate this escape from everyday monotony.

*“We have a teacher at our school who uses these types of methods and I am always very excited when attending his lessons, I pay more attention.” (Slovak student)*

*“When teaching by these new methods I kept my attention and I was not bored.” (Slovak student)*

*“I felt good – a good reason to work in the future in this field.” (Romanian student)*

The majority of students found the tasks useful, and as a result of their novelty and freshness, they participated more actively in the lesson processes, which often led them to

collaboration and competition, thus establishing the mood for the lesson. It also turned out that teamwork is important for students (but they do not have the opportunity to practice it in traditional teaching). This issue also shows that competition and prizes provide extra motivation for them:

*“I was more motivated, especially by the prize.” (Hungarian student)*

#### **2.4. Advancement and result of teaching**

As we have already observed, new methods can play an important role in motivating both students and mentors. At the same time, a Hungarian mentor believes that actually an already existing situation is transformed to be useful as the Z-Generation enjoys technology and they play games:

*“As I said before, we need to keep abreast of the times. Having the students’ attention is important, and I think these students play a lot in their spare time, too, so why wouldn’t they also learn meanwhile?” (Hungarian mentor)*

Slovak mentors mention that students themselves encouraged the instructors to use the gamification elements during the whole teaching process and they were more motivated to reach positive incentives or rewards in form of e.g. praxis at “elite working place” or creation of own products that would be presented in the company or they could take it home.

In addition to motivation, and keeping the students’ attention for longer, other results are mentioned: they can remember the information easier, learn many things in a short time, and they also ask more questions. The latter is also due to the fact that they need to be more active and be able to answer certain questions during the tasks.

*“Yes, there is a more active participation of the students in the training, the students ask more questions, they are interested in presentations because they have to answer them, in the game, to the questions on the subjects taught.” (Romanian mentor)*

Although less, mentors can still see the differences between the attitude of the students as it is easier to motivate some than the others. Mentors agreed that the real effects will only be seen later and it is hard to talk about results after such a short time.

The students remember the courses as being useful and enjoyable. The methods used helped them in the learning process, they remembered what they learned, and even remembered the concepts better. It also helped in the learning process, and with the extensive use of tasks and tools, their previously acquired knowledge resurfaced, and they successfully applied it. Teamwork and cooperation was a positive and new experience for them (*“cooperation was difficult at first, but towards the end we were able to work together quite well”*), and in some cases they even realized what their strength is (*“teamwork is my strength”*). They also confirmed that this way results last longer, *“it deepens the knowledge”* and *“knowledge is easier to reach”*. It can be also useful for them to come up with answers on their own:

*“By playing games (method of 4 doors) we had to find information by ourselves so that the final knowledge was more understandable and stayed in our memory for a longer time.”*  
(Slovak student)

Some students considered it necessary to emphasize the importance of the competition and prize as an extra motivation. They agreed that points, smiling faces and marks are not proper forms of evaluations – of course, they would prefer financial rewards.

## **2.5. Challenges, suggestions and future steps**

Despite the fact that gamification has several advantages and some results are already visible, mentors and students have to face some challenges as well. In case of mentors, opinions differed most on this issue. Hungarian mentors consider that the biggest challenge can be the lack of proper tools as schools are poor-equipped and the financial background of the students is different.

*“Unfortunately, many students come from broken and poor families. Lack of proper tools can be a problem.” (Hungarian mentor)*

*“The method is limited by the lack of technical preparedness. Unfortunately, many places do not have a computer room. If nothing else, we need a smart board to solve the problem.” (Hungarian mentor)*

*“It would be good if all schools were well-equipped; unfortunately, this is not yet solved from the digitalization aspect in our case, although I think there are worse cases.” (Hungarian mentor)*

A disadvantage of the method is that *“it can be applied during the teaching of theoretical knowledge, but it is not yet possible to apply it in practical training“*. They also mention that maintaining the magic of novelty can be challenging, but they would recommend to integrate it into the system from the 9<sup>th</sup> grade.

Romanian mentors highlight another challenge: finding *“the balance between the time spent teaching the basic information and the time spent playing the game”* can be hard. However, their main fear is that students will *“consider that the job is just a game”*.

*“The biggest problem is that surrender is a secondary action during the production process, which is so complicated, crowded and with many problems. The limit is that some will see the life and production as a game all the time and do not take them seriously anymore.” (Romanian mentor)*

Slovak mentors tell that implementation of gamification methods has to be systematic and *“a trainer has to be prepared that in case he/she decides to implement gamification methodology in his training, students will expect such an approach during every class and their pressure can be very strong.”* The instructors agreed upon sharing their materials and practices among themselves.

Most of the students did not want to change the methods, because they met their expectations. Even the passive ones became active participants during the lessons. However, some suggestions have been made: to expand the tool set, to include networking and



topologies, pay rise, telephone tests, digital learning. They would also like to have more online questionnaires, more chances to win something, more quizzes, crossword puzzles and playful tasks. One of the students mentioned that *“every two weeks, it would be nice to see Kahoot or other competition tasks, fitted to the profession”*. Slovak students would like to use gamification in almost every subject: English, Slovak, history and even electrotechnics or mechatronics.

It will require a lot of work from the mentors to gamify certain content for further parts of the curriculum, to include in a framework and maintain this content as a single system. The DEMETRA model provides the possibility for this, but it will require the coordinated work of several different levels at company level to apply it.

### 3. Conclusions

Based on the qualitative analysis we can clearly state that positive feedbacks dominated. The mentors successfully applied the different types of gamified tasks which resulted in greater activity among students. Both mentors and students mentioned positive results: using gamified methods students could focus better, could remember things more quickly and they believe that what they learned was also deepened (*“knowledge stay in their head for a long time”*). However, mentors consider that it takes more time to see the real results.

The tasks, including word search, crossword puzzle, pop quiz and treasure hunt methods, Mentimeter and Kahoot, took the students out of their daily routine and offered them extra motivation. The majority of students found the task useful. In general, it can be concluded that most of them did not want to change the methods, because they met their expectations. The training and the use of new methods also had a positive impact on mentors as they became more self-confident, despite the fact that they had to face some challenges as well (*“There were some difficulties in the application, which I did not think about in advance, but the supervision helped a lot.”*).

For some students even the teamwork and cooperation with others was novelty as traditional teaching does not include these kinds of tasks. It is also necessary for the mentors to know their students well and this way to find the best gamification methods. Most of the students experience competitions as a positive fact and found it exciting to “fight” for rewards. Others did not feel comfortable in such situations. The exceptions are presumably due to the traditional rating system which is deep-rooted in students’ minds. Mentors emphasize the importance of an early inclusion of gamification methods: they suggest to integrate it into the system from the 9<sup>th</sup> grade.

We can also conclude that mentors require more time for preparation: longer pilot training, role model teaching, real testing in praxis. Even some Slovak students highlighted the need of a better preparation of the trainer. Mentors need to receive also more information about existing gamification methods and their creation.

Mentors specify more challenges which must be kept in mind. Hungarian mentors consider a problem the lack of proper tools and the fact that not all schools are well-equipped.

Students from poor family backgrounds are not expected to use their own resources and tools. This way the company must dedicate time, resources and money in order to implement successfully not on experimental scale but on large scale. It requires a specific infrastructure, materials, time and people dedicated almost entirely on this topic in order to be able to quantify results. Romanian mentors feel the need to draw a line between playing and working: a clear separation must be made between teaching by means of gamification and playing at work. Finally, as mentioned by Slovak mentors, continuous renewal can also be a challenge. The interest of the students must be constantly maintained, and for this it is necessary to develop more and more new methods.

#### **4. Recommendations**

- For efficiency and information flow, mentors should share their experiences among themselves.
- It is necessary to supply additional materials for mentors to be able to keep up with what is new.
- It could be useful to gather usable materials on a separate website so that mentors and students can easily access them. This can also be a forum for mentors to share their ideas and experiences.
- When applying more complex education methods, instructors/mentors could use a support from the side of students.
- A larger pilot training is needed for mentors.
- Gamification should be integrated into the system from the 9<sup>th</sup> grade when students are not yet so used to classical methods.
- Companies must dedicate time, resources and money in order to implement gamification methods as some students do not have the proper tools.
- It would be interesting to complete two tests with the students, one after a traditional lesson and one after using gamification methods, and at the end to compare the results. If (in addition to the opinions) the results of the tests will be in favor of the second method, it can give new motivation to mentors and students as well.