

Escape Room as a Stimulus for Experimental Activity

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Abstract

In the article, we focus on the stimulation of pupils' experimental activity using escape rooms. The text includes a division of escape rooms into six genres. In one of the genres, we also included the activity of the escape room created by us. By using the escape room we created, we tried to find out whether escape rooms are a suitable tool for stimulating pupils to do experimental activities in physics classes. We conducted a survey with pupils in the third year of an eight-year high school (13-14 years old). The number of pupils varied (18-19) as the survey was conducted over two weeks. We created a questionnaire consisting of seven questions. The questions were about pupil emotional engagement while doing experiments. We determined the suitability of the teaching tool for stimulating pupils using the answers to the questions from the questionnaire, which are related to the stimulation of experimental activity. We also compared the activities - Escape Room and Experiments given by a question using a comparative questionnaire. From the pilot survey, we found that escape rooms stimulate pupils to experiment more than the commonly used experiments given by a question in physics classes.

Escape rooms

Nicholson (2015; p. 1-2) dealt with escape rooms in his research. 175 facilities with escape rooms participated in the research. The author defines escape rooms as live team games in which players uncover clues, solve puzzles, and complete tasks in one or more rooms to reach a specific goal within a limited time. The escape game begins by explaining the rules of the game to other players, revealing the story of the game. The author focused on escape rooms in everyday life. We have created an escape room in an online environment focused on physical education. Escape rooms require teamwork, communication, task management, critical thinking, attention to detail, and secondary thinking. The success of a team in classic escape rooms depends on various factors, be it the experience of the players, the diversity of their experience, or their physical abilities.

Escape rooms are used in various industries related to education (Veldkamp, Van De Grint, Knippels & Van Joolingen, 2020b; p. 2):

- familiarization of students with the institutions' services,
- observing the behaviour of students when searching for information,
- observation of students' learning processes in teams,
- when using group work and the leadership skills of students.

In addition to physics (Vanyová, 2022; Vörös & Sárközi, 2017), escape rooms are also used in other subjects – mathematics (Arnal et al., 2019), chemistry (Dietrich, 2018), computer science (Ho, 2018), and others.

Authors (Veldkamp et al., 2020b) state that almost every escape room they have focused on in their work has been created to explore active learning environments with a focus on increasing

student motivation and engagement, supporting learning while developing teamwork, communication, and other general skills.

Escape rooms bring a new way of acquiring or consolidating students' knowledge into the classroom. The authors (Taraldsen, Haara, Lysne, Jensen & Jenssen, 2022; p. 169-184) addressed student teachers working with escape rooms. The authors see escape rooms as a promising start in the process of providing important information about how escape rooms should be used in elementary and secondary education. Miller (2016) argues that escape games were first popular in the online space in the form of computer games or video games, and only later came out of the online space.

Nicholson (2015; p. 4-6) classified escape rooms into genres. Some genres of escape rooms originated independently of each other but share common elements. The author lists 6 genres:

- Live-action role-playing –players receive the rules and scenarios of the game, dress up in costumes and solve various puzzles and problems within a predetermined time limit.
- Point-and-click adventure games and Escape-the-room digital games – this game genre is based on a live-action escape room with elements of an interactive fictional game. Players explore locations, find and combine items, and solve riddles and puzzles by inputting computer commands. If we were to classify the escape room we created, we would place it in this genre.
- Puzzle hunts and Treasure hunts – the essence of this genre is that players work in teams and solve a series of puzzles, many of which are given on paper or digitized versions of paper puzzles. Puzzles are multi-level, so by solving one set of puzzles, players solve another set of puzzles that follows the previous one in a limited space for individual teams. The treasure-hunting genre is based on geocaching.
- Interactive theatre and Haunted houses – players enter an interactive environment that brings them entertainment.
- Adventure game shows and movies – they are shown on television and are mostly based on the physical activity of players who try to solve puzzles and thus win.
- The themed entertainment industry – escape rooms are a combination of games and themed entertainment. Such escape rooms have a different focus and can be intended not only for groups of friends but also they can be intended for schools.

As we mentioned above, escape rooms are mainly about working in groups. The size of the group plays an important role in its success of the group. The number of people in the group should not be too large either so that the participants can cooperate and there is no division into smaller groups. Groups should also not contain too few people, as a smaller number of people does not bring multiple points of view to solving the puzzles, and thus the group may not succeed. Therefore, in his study, Nicholson (2015; p. 11) collected information on the average size of groups in escape rooms. The average group size in Europe is 3.98 people; in North and South America, the average group size is larger than in Europe at 6.07 people. The smallest minimum of group members in Europe is 2 people and the largest maximum is 7 people.

Escape rooms should have a main theme that guides players throughout the escape room. Nicholson (2015; p. 15) reviewed the most common escape room themes. The topic of escaping from an unpleasant place or room (e.g. prison, dungeon) was the most frequently encountered, up to 30%. The second most common topic was escape rooms listed without a specific topic, i.e. only listed as Escape Rooms. Escape room themes such as Investigating a mystery or crime, Finding a missing person, Helping create a potion or poison, and Freeing a missing person or

an animal have approximately equal representation. So escape rooms can have different themes. Not every escape room has the condition that players must escape from a specific room by solving puzzles to win. Escape rooms can also vary in their tasks and design.

DuPlessie (2013) found that there are 3 things that players enjoy about escape rooms and that players can be part of the story, feel heroic, and engage in something challenging. This can also be applied in teaching using the activity of the escape room when students feel involved in the action in the classroom. The duty to solve the mystery concerns all members of the group, and each student can bring his perspective to the solution, which can only be beneficial for the group because the tasks in the escape rooms are not easy and require divergent thinking. The feeling of heroism when rescuing people or animals from rooms or escaping from a room can motivate students in solving tasks.

Activity – Experiments given by the question

The main research question of this pilot survey was whether escape rooms are a suitable stimulus to encourage pupils to experiment. From a psychological point of view, all activities are stimuli, but through repeated use, a habit occurs. And thus, to reduced interest in experimentation. The purpose of the study was to look for and verify this stimulus with the pilot survey. Before the activity – Escape Room – we held a class during which the pupils had to carry out experiments given in the form of a question. We provided the pupils with aids for the experiments, gave them the main question of the experiment, and let the pupils work in groups. If the pupils did not know how to continue, we helped them with auxiliary questions. The experiments we chose were:

- The corner-cube reflector
- Mirror height
- Fish in the aquarium

The corner-cube reflector

The pupil's task was to create a corner-cube reflector from mirrors that will reflect the incident beam to its original place. To create a reflector, the pupils needed the following tools:

- 2 mirrors,
- light pointer.

The experiment is that the ray incident on the first mirror is reflected at the same angle as the angle of incidence. This reflected ray hits the second mirror and is also reflected at the same angle as the angle of incidence because the law of reflection applies. If we place the mirrors so that they are at right angles to each other, the incident and reflected rays have opposite directions. The pupils have to figure out how to place the mirrors so that the incident beam and the reflected beam have opposite directions.

Mirror height

In this experiment the pupils determine the required height of a mirror in order to see themselves. The required tools are:

- larger mirror,
- measuring tape.

During the implementation of this experiment, the pupils had to realize that if they wanted to determine the height of the mirror so that one of the pupils could be seen in it, they needed to

choose one pupil for whom they would determine the height of the mirror. Since the pupils in the group have different heights, the height of the mirror does not have to correspond to each pupil. The height of the mirror, so that the pupil can see themselves in it, that is, to see their forehead and the tips of their feet must be measured on a vertical surface. If pupils want to determine the height of the mirror, they need to know that the law of reflection applies. Thus, the size of the angle that the incident beam makes with the perpendicular of incidence is the same as the angle that the reflected beam makes with the perpendicular of incidence. The beam coming from the pupil's forehead after reflection falling into the pupil's eye must be reflected at half the distance of the eyes from the forehead. The same applies to the beam coming from the tips of the feet and falling into the pupil's eye. Thus, the total height of the mirror for the pupil to see in it corresponds to half the height of the pupil. The location of the mirror on the wall is also important in this experiment.

Fish in the aquarium

In this experiment, the pupils had the following tools prepared in advance:

- stick,
- paper (2cm x 1cm) with an aquarium print,
- paper (2cm x 1cm) with fish print,
- glue.

The paper on which the fish is printed and the paper on which the aquarium is printed should have the same dimensions. The pupils' task in this experiment is to get the fish into the aquarium without cutting the paper (see Figure 1).

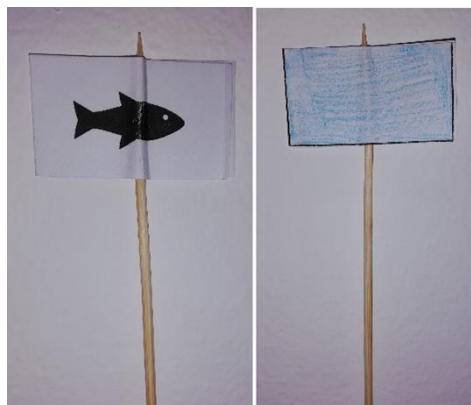


Figure 1: Experiment – Fish in the aquarium

Pupils should stick the aquarium on the stick and stick the paper with the fish on the other side of the stick. By rotating the stick fast enough (about 20 rotations per second), the pupils will see that the fish is in the aquarium. The whole explanation of the experiment is based on the inertia of the eye. Irritation of the eye due to visual perception occurs only after a certain time and disappears also only after a certain time. This also causes the perception of continuous movement of characters on the projection screen in the cinema.

Activity – Escape Room

We created an escape room activity that could be classified into one of the genres of escape rooms according to Nicholson (2015; p. 4), namely Point-and-click adventure games and Escape-the-room digital games. The escape room created by us takes place in an online space,

but the pupils are present in the physics class together with the teacher. Each group of pupils had one tablet at their disposal, on which they work.

The authors (Veldkamp et al., 2020a; p. 1234) state four guidelines for the creation of educational escape rooms resulting from their study, which we followed when creating our activity:

- Co-creation of the activity with the pupils for whom the game is intended. The pupils had the opportunity to express their observations on the activity after the pilot testing.
- Start from scratch or use a prototype that meets the educational requirements. When creating the activity, we were inspired by available activities. During the search, we mainly focused on the availability of platforms on which the escape room activity can be created.
- Creating hybrid learning spaces. The activity is based on a real-world scenario linked to physics topics. The theme of the escape room is rather fictional, but the locations are real.
- Serial testing of the activity from different perspectives (teacher, pupil, player).

The theme of the escape room is to rescue a princess who has been kidnapped by a dragon and is hiding in an unspecified location. Since the pupils who took part in the survey were aged 13-14, we consider the choice of such a topic to be appropriate for their age. The choice of topic matters (Marsico, Mollo, Albano & Pierri, 2019). The topic should be appropriate for the age of the pupils: it should not be too scary, stressful, inciting to violence, or too personal, but at the same time interesting and motivating for action.

When creating the escape room, as mentioned by the authors (Veldkamp et al., 2020a; p. 1234), we were inspired by already available online platforms. These platforms we used are not primarily intended for creating escape rooms, but we saw potential in them. The basic platform we used consisted of a google form that could be modified to fit the needs of our escape room. This form contained locks that, when clicked, contained an instruction for the pupils to follow. The instruction consisted of either a question or a declarative sentence. Part of the instruction was a link that redirected the pupils to the task they were supposed to solve. Pupils had to open the locks one by one, from the first lock to the last. They couldn't skip one lock if they didn't know it and move on to the next.

The secondary platforms on which the tasks were located consisted of applications for creating learning activities. Again, we chose applications that corresponded to physics tasks in their form. The form of the first task was different for each group. The first group had the task of solving a crossword puzzle. Another group had the Millionaire game as their first task, and the last group had a filler task. The visual of all the tasks is in Fig. 2. To unlock the first lock, the first group had to solve a crossword and enter the password of the crossword in the box. To unlock the first lock of the second group, the pupils had to solve all the tasks in the game Millionaire, and thus they got the code to open it. To unlock the first lock of the third group, pupils had to add words to the physics text, and after completing them correctly, pupils received a code to open it. All tasks were in Slovak, but for the article, we translated the tasks into English.



Figure 2: First tasks – crossword, millionaire, missing word cloze (prepared in the app <https://lnk.sk/qzer>)

The second task was a puzzle (Fig. 3). This task was the same for each group, but by the fact that the puzzle pieces were arranged differently with each new click, the pupils did not notice that each group had the same task. After solving the second task - a puzzle, the secret conversation between the princess and the prince was revealed to the pupils. To unlock the second lock, pupils had to answer the question given in the lock's instructions. The groups had different answers to the question.

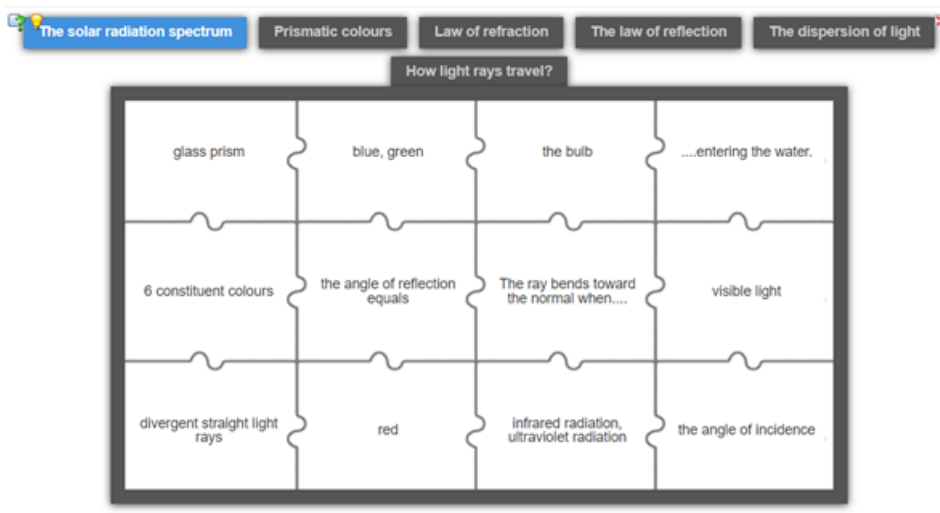


Figure 3: The second task – puzzle (<https://lnk.sk/izeg>)

The third task was the same for all groups. The pupils had the task of assigning the names of the properties of the created image to the image with prominent rays. The task contains four images and four names of image properties. After solving this task, the pupils received a shopping list, which contained a list of tools needed to experiment. With this shopping list, they came to the teacher, who gave them the supplies listed on the list, so the pupils could start the experimental activity.

Applied experiments

Since we divided the pupils into three groups and determined that each group would do a different experiment, we chose the following three experiments:

- A darkened box with a message
- Disappearing image
- Magnifying glass from water

A darkened box with a message

The necessary tools to experiment are listed below:

- darkened box,
- water,
- laminated paper,
- funnel.

In this experiment, the pupils were tasked with reading a name of the location where the princess is hidden. The name was written on a sheet of laminated paper placed in a darkened container, which was not legible without the pupils pouring water into the container. Before experimenting, the teacher prepares the container with the laminated sheet. The paper needs to be laminated so that it does not get wet after pouring water. The paper must be placed in such a position that the pupil cannot read the text when observing the inside of the container through the opening. The teacher must try this experiment in advance to be able to determine how much water is needed for the pupil to see the sign with the location through the hole. A funnel is used to pour water through a hole other than the observation hole.

The explanation of the experiment, why in a darkened container with water the pupil sees the inscription and in the same container without water the pupil does not see the inscription, is that light is refracted when passing from one medium to another: water to air. So, the light is refracted at the interface. We always see objects in the direction of the ray falling into our eyes, so it seems to us that the objects are in a different place than they actually are.

Disappearing image

The pupil's task was to read an invisible text written with a flame on black paper. Tools that were needed to experiment:

- thick black paper,
- water,
- candle,
- matches.

Before experimenting, the teacher prepares a sheet of hard black paper on which they use a candle to write - blacken the name of the place where the princess is hidden. Instead of hard paper, we can use a glass plate on which black paper is stuck so that the paper does not bend and is easier to read. Text blackened in this way is not so visible on black paper. The paper is readable only after placing it in water when the text appears as silver.

The experiment is based on the fact that the blackened surface of the paper does not get wet in water. Therefore, a thin layer of air is formed in the place of blackening. Rays falling on the water-air interface at an angle greater than the cut-off angle will result in total light reflection. Blackened text, therefore appears silver. The rest of the black paper, which is not blackened by the candle, remains black when placed in water. Therefore, when placed in water, the difference between the blackened and non-blackened surfaces will be visible.

Magnifying glass from water

The pupils had the task of making a magnifying glass using a drop of water to read the reduced text. Tools that were needed to experiment:

- paper,
- hole punch,
- lamination,

- pencil,
- water.

Make a hole in the paper with a hole puncher. We laminate this paper and make a smaller hole in the place of the hole with the tip of a pencil. Lamination avoids wetting the paper. Before experimenting, the teacher must try the magnifier made in this way to be able to decide whether the text can be read for the selected text size. The reduced text should not be readable with the naked eye. We encrypted the name of the place where the princess is hidden with different characters resembling the original letters (e. g. @ = a, € = e). By dripping water into the excavated hole, we create a magnifying glass for reading reduced text.

The explanation for this experiment lies in the fact that a drop of water in a hollowed-out hole will take the shape of a convex lens and will therefore behave like a magnifying glass. The larger the hole in the laminated paper and the larger the drop of water, the greater the magnification.

All shopping lists of individual groups with gadgets are shown in Figure 4:

PHYSICS TOOLS FOR EVERYONE	PHYSICS TOOLS FOR EVERYONE	PHYSICS TOOLS FOR EVERYONE
PHYSICS TOOLS KONSTANTINOVA BRATISLAVA SLOVAKIA 89453	PHYSICS TOOLS KONSTANTINOVA BRATISLAVA SLOVAKIA 89453	PHYSICS TOOLS KONSTANTINOVA BRATISLAVA SLOVAKIA 89453
CASHIER: JOHN CUSTOMER: PRINCESS	CASHIER: JOHN CUSTOMER: PRINCESS	CASHIER: JOHN CUSTOMER: PRINCESS
PURCHASE:	PURCHASE:	PURCHASE:
PLASTIC VESSEL 8.80€ WATER 1.50€ PAPER 8.60€ LAMINATION 8.20€ FUNNEL 2.30€ HST +20% TAX: 2.50€	AQUARIUM 28.15€ WATER 1.50€ BLACK PAPER 8.20€ CANDLE 8.15€ HST +20% TAX: 5.80€	PAPER 8.20€ WATER 8.50€ LAMINATION 8.25€ BLUE PAPER 8.20€ HST +20% TAX: 8.20€
TOTAL: 15.40€	TOTAL: 38.80€	TOTAL: 1.30€
PAYMENT METHOD: CREDIT CARD TRANSACTION #1675025888 -001 DATE:1/12/2022 12:58:42 PM	PAYMENT METHOD: CREDIT CARD TRANSACTION #1675025968 -001 DATE:1/12/2022 12:58:42 PM	PAYMENT METHOD: CREDIT CARD TRANSACTION #1675026033 -001 DATE:1/12/2022 12:58:42 PM
NO RETURNS	NO RETURNS	NO RETURNS
THANK YOU	THANK YOU	THANK YOU

Figure 4: Shopping lists of physics tools (prepared in the app <https://lnk.sk/nm47>)

Methodology

Pupils in the third year of the eight-year high school (ages 13-14) took part in the survey. The number of girls in the class is 12 and the number of boys is 14. In the given year of study, the pupils had two hours of physics per week. Pupils who participated in the pilot survey go to a state selective grammar school. Since the survey was carried out in physics classes over two days, the number of pupils was different. The survey took place in divided physics lessons, so we worked with small groups of pupils. The number of pupils in the group ranged from two to four pupils. Throughout the survey, the members of the groups changed. We surveyed at the turn of November and December. We set aside four divided hours of physics for research. Since the physics lessons are divided, the maximum number of pupils in the first group (from 8:00 - 8:45) was 13 and in the second group (from 8:55 - 9:40) there were also 13 pupils. On the first day of the survey, we included an activity - Experiments given by a question, in which we divided the pupils from the first and second divided lessons into six groups. The teacher divided the pupils into groups so that the groups were approximately equal in terms of knowledge based

on knowing and teaching them. Since the element of competition is also applied in the activity, the groups should be able to cope with competition and we tried to achieve this precisely by dividing them into groups with comparable knowledge, we also tried to apply the peer learning method. Table 1 shows the number of pupils belonging to the group, the name of the group, and the experiment they were given.

Table 1: Division of groups during the activity – Experiments given by the question

Group	Number of pupils	Experiment
A	3	The corner-cube reflector
B	4	Mirror height
C	4	Fish in the aquarium
D	2	The corner-cube reflector
E	3	Mirror height
F	2	Fish in the aquarium

On the second day of the survey, we carried out an activity - An Escape Room. We also divided the pupils into six groups, and in Table 2 we list the names of the groups, the number of pupils in each group, and the experiment they worked on. As we already mentioned, the groups did not contain the same members as on the first day of the survey, so we named the groups with lowercase letters.

Table 2: Division of groups during the activity – Escape room

Group	Number of pupils	Experiment
a	4	A darkened box with a message
b	3	Disappearing image
c	4	Magnifying glass from water
d	3	A darkened box with a message
e	3	Disappearing image
f	2	Magnifying glass from water

Before implementing the activities, we made a questionnaire with seven questions. The answers are given in the form of a Likert scale (1-5). We made a quantitative analysis of the questions in the questionnaire, and we ascertained the pupils' opinions in more detail using a discussion with them. The questionnaire included the following questions:

- How satisfied were you with your performance during the experiment?
- How would you rate your involvement in group work?
- Are you satisfied with the result of your experiment?
- How motivated did you feel during this activity?
- Do you think you learned something new?
- Do you think the experiment you were doing was interesting?
- How did you like this activity?

Using the questionnaire, we wanted to find out how satisfied the pupils were with their performance in the given activity, how they would rate their involvement in group work, how motivated they felt, and other questions. With the help of these questions, we wanted to find out whether the activity - Escape Room is a stimulating element for experimental activity more than the activity - Experiments given by the question.

At the end of both activities, we gave the pupils, in addition to the above-mentioned questionnaire, another questionnaire in which they had to compare the individual activities with each other. That is, to choose between the activity - Experiments given by a question and the activity - Escape room. This questionnaire consisted of the following questions:

- In which of the activities were you most satisfied with your performance during the experiment?
- In which of the activities was your involvement in group work the greatest?
- In which of the activities were you most satisfied with the result of your attempt?
- Which of the activities did you feel most motivated?
- Which of the activities do you think you learned the most from?
- In which of the activities do you think the experiment you did was the most interesting?
- Which activity did you like more?

The course of the survey

The survey took place in the form of observation, the teacher is also the observer of the survey. During the activity “Experiments given by a question”, pupils worked in groups. In this activity, the pupils needed more auxiliary questions to successfully experiment. We had to stop several times at some groups to help the pupils. Occasional problems occurred in the activity - “Escape Room” while pupils were entering internet links. Otherwise, the pupils had almost no problems with the functioning of the application. The application did not crash, and transitions between applications were smooth. Since the pupils were working with tablets, they had a large enough space for manipulation and could exchange tablets among themselves. If they were working on a computer, this manipulation would not be possible.

Results and discussion

We evaluated the questionnaire in such a way that we marked the answers to each question with points from 1-5, from the most positive answer (5) to the least positive (1). We processed the evaluation of the questionnaires of all groups for the activity – Experiments given by the question in Table 3.

Table 3: The evaluation of the survey for the activity – Experiments given by the question

	1. question	2. question	3. question	4. question	5. question	6. question	7. question
Total average	4.72±0.45	3.94±0.85	4.39±0.76	3.61±0.83	3.33±1.67	3.78±0.85	4.28±0.73
Total (%)	94%	79%	88%	72%	67%	76%	86%

For the second activity – Escape room, we processed the results in the same way (see Table 4).

Table 4: The evaluation of the survey for the activity – Escape room

	1. question	2. question	3. question	4. question	5. question	6. question	7. question
Total average	4.74±0.55	4±0.86	4.63±0.58	4.26±0.83	3.53±0.94	4.37±0.67	4.47±0.60
Total (%)	95%	80%	93%	85%	71%	87%	89%

As a result, we noticed a positive effect of the escape room activity on the experimental activity, and in the future, we plan to conduct research on a larger sample of pupils. We will evaluate the results of the research on a larger sample of pupils statistically. Since the pilot survey was conducted on a small sample of pupils, we decided not to do a statistical analysis. Both tables (see Table 3 and Table 4) show the percentage of positive responses. Thus, the larger the percentage value, the more positive the average response was. The answer to the question of this survey is whether escape rooms are a suitable tool for stimulating pupils to experiment. The answers to the question “How motivated did you feel during this activity?” showed that the pupils felt motivated during the activity – Experiments given by question showed an average response of 3.61 points, which corresponds to the answers - appropriately/almost completely. Pupils in the activity “Escape room” gave an average answer of Almost completely/At the most, which corresponds to 4.26 points. So we can say that there were more positive reactions to this question in the escape room activity.

To the question “Do you think the experiment you were doing was interesting?” during the activity “Experiments given by question”, the pupils on average responded with the answer Almost completely, which corresponds to 3.78 points. Pupils reacted more positively to the activity “Escape room”, with 4.37 points. The number of points corresponds to the same verbal answer as for the activity “Experiments given in the form of a question”, but it differs in the number of points by 0.59.

Compared to the previous question, there was a less significant improvement in the question “How did you like this activity?”. Comparing the two activities, the average response differs by 0.19 points. The highest increase in the number of points from the answers to all questions occurred in the question “How motivated did you feel during this activity?” that we focused on when determining escape rooms as a stimulating element of experimental activity.

From the questionnaire comparing these two activities, it emerged that pupils mostly indicated the activity “Escape room” in their answers. It happened that three pupils marked both activities

as an answer to some questions and therefore we did not take these answers into account. We present the results of this comparative questionnaire below:

Table 5: The evaluation of the comparative questionnaire

Question	Activities	
	Experiments given by the question	Escape room
1.	15 %	85 %
2.	50 %	50 %
3.	27 %	73 %
4.	0 %	100 %
5.	46 %	54 %
6.	21 %	79 %
7.	20 %	80 %

As we can see in Table 5, for almost every question the pupils chose the activity - Escape Room. When asked the question “In which of the activities was your involvement in group work the greatest?”, the same number of pupils chose both activities.

Ethical issues of the survey

The aforementioned school, which has consent from the pupils' parents for similar purposes, agreed to conduct the survey at the grammar school in Bratislava. The pupils who participated in the survey were informed in advance about the purpose of the survey and agreed to participate. Their anonymity was maintained throughout the survey. After the research, they were informed about the results of the research.

Conclusion

In the article, we dealt with escape rooms as a teaching tool for stimulating pupils to experiment. In teaching, it is desirable that students develop scientific work abilities (McBain et al., 2020). Pupils are stimulated to experiment with experiments given by a question even in classical lessons, but pupils stimulated by a repeating stimulus (experiment given by a question) get used to it and there is less interest in experimentation (Akpan, 2020). Therefore, in order to avoid a decline in interest in experimentation, we try to find various other stimuli. Subsequently, we want to verify these collected stimuli in research through a semi-structured interview with teachers and a questionnaire with a Likert scale for pupils. We conducted the survey in the third year of an eight-year grammar school (13-14-year-old pupils), in which we compared the activity - Experiments given by a question with the activity - Escape room.

In the post, we describe the activity - Experiments given by a question, which was based on the fact that the pupils were supposed to solve an experimental problem and thus answer a predetermined question. We compared this activity with the activity - Escape room. The essence of the creation of the escape room was to stimulate pupils to experiment.

The results of the questionnaire survey showed that the activity - Escape room is a suitable stimulating element for the experimental activity of pupils. Pupils smoothly transitioned from the online space of the application to the real world of experiment preparation. During the activity “Experiments given by a question”, it was noticeable that the pupils did not see the

essence of experimenting, they did not see the meaning behind it, and why they should do it. In contrast to this activity, in the activity “Escape room”, pupils saw the essence of the experiment, because as a result of the experiment they found out the location where the princess is located. Pupils in the escape room were attracted to the solution to this mystery.

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