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## Game-Based Learning Practices in Austrian Elementary Schools

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### Abstract

Contemporary literature studies show constant changes in the world of learning and teaching, and over the years game-based learning has been considered one of the most effective ways to learn something new. The purpose of this research was to understand the teaching practices used in game-based learning, and its importance in the elementary school teaching process. The study involved 24 teachers from six elementary schools in Austria. Semi-structured interviews were used. The research extended over a two-month period, including the researcher's observations and participation in classes. The results of this study are based on the descriptive analysis of teachers' views. According to the study's findings, but also from the researcher's observations, it is understood that game-based learning in Austrian elementary schools is a common teaching practice, which establishes the context of game-based learning that is fun and productive for children. Also, the results from this study illustrate the activities that teachers apply in different subjects, and show the different capacities and skills that children develop through games. According to teachers, game-based learning presents ongoing challenges related to finding and designing diverse game activities, and adapting their learning to the needs and interests of pupils.

**Keywords:** Game-based learning, pupils, elementary education, teachers.



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## Introduction

Game-based learning is considered by many researchers as a teaching method that encourages children to participate in active learning by working together, which helps each individual develop their own skills and abilities, as well as to develop positive values.

Game-Based Learning simply means including knowledge matter of subject into games (Dadheech, 2019). During games, pupils do not feel like they are learning, and the knowledge gained through games is remembered longer than the knowledge gained in other ways (Dragović, Rovčanin, & Gazivodaa, 2012). Games can effectively trick students into learning while they engage with the material (Matthew, 2019).

In primary schooling, children learn reading, writing, counting and much more. However, the ability to learn all these things and to get along well with other children, is exercised and developed by the child at an earlier stage, through play. This means that playing is not only for pleasure, but also directly relates to their future success in school (Bodnar, 2019).

The Austrian elementary education curriculum focuses upon learning methods and materials through game-based learning. In designing teaching at the primary school level in a way that is appropriate for children, and is both lively and stimulating. Teachers have to impart various learning techniques based on the circumstances, and try out various forms of learning that are deemed appropriate to primary school education (EURYDICE, 2019).

Educational goals are important ingredients of engaging games in learning, and is the most important element in enabling learners to earn new skills. When creating games for learning, the appropriate educational structure must be established in order to construct training that is professional and not just the playing of simple games. This is something that cannot be done with a serious games authoring tool (Teyssier, 2016).

While incorporating games and game-based learning into the classroom has proven to be successful, not to mention popular among students, it can also be a difficult task. No matter how relevant game-based learning has become, over 80% of teachers view games as challenging to successfully weave into curricula and to utilize them effectively in the classroom (Denham, Mayben, & Boman, 2016).

According to researchers, primary schools' aims are that students acquire certain basic fundamental skills. The opportunity is offered to school children to develop their cognitive, emotional, affective, social, and physical dimensions, and to acquire a certain level of obligatory knowledge. Primary education offers itself as a formative school which, by means of the alphabet of disciplines, gives the ability to exercise different powers of thought, thus providing an introduction to the development of reflective and critical thought (Sclaunich, 2011).

Games can enhance the social skills of students as well as improve their skills in understanding and problem solving (Kirikkaya, Iseri, & Vurkaya, 2010).

The literature often speaks of integrative didactics which aim at an active involvement of the subjects, which facilitate the involvement and motivation of young learners. This approach also aims to avoid reactions of boredom – and together, all these characteristics describe game-based learning activities (Sclaunich, 2011).

Walker also suggests using games as a way to discreetly combine difficult course content with opportunities to practice different skills in a low-stakes, engaging environment as “students benefit from experiencing an interactive classroom in which they actually learn material rather than just memorize it for an exam” (Matthew, 2019).

Regardless of the format of the game, students can simultaneously build their problem-solving skills while having fun throughout the process where an instructional game is well-designed (Harris, 2009; MacKenty, 2006).

Researchers speak of games as an integrative didactic instrument, aimed at the active involvement of subjects, and which manages to include, motivate, and avoid boredom reactions – all of which are characteristics that describe gaming activities (Sclaunich, 2011).

Marzano (2010) explained that of the 60 studies he had been involved in regarding the effects of games on student achievement, “on average, using academic games in the classroom is associated with a 20-percentile point gain in student achievement” (p. 71).

Bruner suggested that children can learn through the process of play which is not an activity in itself but a tool to comprehend aspects of literacy, numeracy, and anything in the environment around them (Bruner as cited in Smidt, 2006).

Bruner, Jolly, and Sylva (1981) underlined how playing games constitutes the principal activity of childhood. According to him, the game in fact enables the individual to feel free from contextual limits, when we play, we concentrate on what we are doing and not why we are doing it, we are absorbed in the game, and therefore free from everything that surrounds us.

Learning games is based on five major dimensions that contribute to the game-based learning efficiency of students, and are identified as; learning environment, learner, pedagogy, context, and teacher (Ucus, 2015).

The empirical part of the current study is based on the context of game-based learning conducted at elementary schools in Austria.

Since the Austrian Elementary Education Curriculum focuses on game-based learning, as one of the current challenge teachers face to incorporate a variety of activities and methods to maintain students’ attention and interest, the current study is an attempt at understanding game-based learning as one of the primary issues in education today. Therefore, the research question for the current study is,

“What are the practices of game-based learning in elementary schools?”

The organization of the categories for teacher questions is based on the proposed multi-year definitions, such as: Games that best integrate into the existing curriculum (Harris, 2009, p. 26), Games which meet the objectives of the topics being taught (MacKenty, 2006, p. 48), and Elementary school teachers’ views on game-based learning as a teaching method (Ucus, 2015).

These categories were then subdivided and subcategories later modified following pilot interviews.

Participant teachers were asked the following interview questions:

- As a teacher, how do you define game-based learning in elementary education?

- What are your views on the importance of game-based learning in elementary education?
- What are your views on which game-based learning activities are applied most frequently in the classroom?
- What examples do you know of instructional games that best integrate into the teaching content?
- What are your views on the selection of instructional games used in the classroom?
- What are your views on the difficulties of implementing game-based learning in elementary education?

The aim of also gathering researcher observation data was to help improve the researcher's understanding of the issues related to game-based learning, but also to understand other education issues in general.

## **Methodology**

### *Research Model*

The qualitative method was employed in this research. Following the descriptive approach, interviewees were each asked about their individual experiences, beliefs, values, knowledge and their perceptions about acts and cases (Yıldırım & Şimşek, 2006).

As prescribed by descriptive research, other data sources were interpreted such as observational notes and conversations held with teachers (Johnson & Christensen, 2017). The purpose of the interviews was to describe, through the voice of the teachers, their practices in the application of game-based learning, and its importance within elementary education.

### *Participants*

Teacher interviews ( $N = 24$ ) were conducted in six elementary schools in Austria. One of the schools included in the study provides multi-grade teaching, which includes preschool as well as first and second grades. Maximum variation sampling was employed for the selection of the teachers (Yıldırım & Şimşek, 2006). The distinguishing criteria set out in the study were the teachers' education level (Bachelor's and Master's) and their level of work experience.

### *Data collection*

The data sources used were semi-structured interviews and researcher observation in order to understand the teachers' practices when applying game-based learning.

The interview form and questions were reviewed by a "Padagogische Hochschule" university expert, and the interview questions were redesigned and updated after conducting a pilot interview. The school principals were contacted via email, and teachers recommended by the principals were then interviewed. The schools were regularly observed over a two-month period (September 2018 and January 2019). Teachers were interviewed during the last week of each 1-month school visit. During the classroom visits, other aspects were also observed such as the classroom environment, the types of games (of different form and material) that the teachers used with their pupils, the grouping of pupils during game-based learning, ways of cooperating during games, the work tools employed, the physical classroom environment, plus many other aspects that were considered beyond the

focus of the current study. In this research, the aim was to only cover issues related to the prescribed research question; however, the observation during this period of other issues that were not the focus of the study, but which were undoubtedly important elements of the learning process, helped form a better understanding of the teachers' practices, and to correlate them to the data from their responses.

#### *Data Analysis*

Descriptive analysis method was used in this study. Interviews were recorded with digital audio recorders and then the data were analyzed. The duration of the interviews ranged from 15 to 30 minutes. In this research, the names of the interviewed teachers were coded with the first letters of their name and then recorded. The analysis started with reading the teacher narratives in which they described their various teaching practices and principles, often illustrating them with teaching situations from their own classes (Riessman, 2008).

The reliability of the study was calculated based on the Agreement / Agreement + Disagreement x 100 formula as suggested by Miles and Huberman (1994), and the reliability of the study was found to be 91% (Yıldırım & Şimşek, 2006).

The following section presents the results according to the research questions, derived from the teachers' interpretations and illustrated with learning situations from their classroom experiences.

### **Results**

The following presents the results of the data obtained from the teachers' interviews. Answers are listed in separate tables for each interview question.

**Table 1.** Teacher definitions of game-based learning in elementary education

Master's degree	Learning by doing, learning through activities is something you cannot learn from theory, learning by having fun, motivating children, fun learning strategies
Bachelor's degree	Actively learning by doing, learning from experience, active and fun learning strategies, learning through activities

From the teachers' perceptions, it can be seen that game-based learning means learning through activities, learning by having fun, learning by doing, and fun learning strategies. One teacher with a Master's degree stated that "Applying game-based learning means motivating children to do something we want them to do, and playing is the easiest way." This is because children only want to play and teachers want them to learn. When these two are combined the outcome is more successful. Also, a teacher added that when children learn through games, it is not perceived by the children as learning, because they do not feel that they are learning, whereas in actuality they are.

A teacher with a Bachelor's degree stated that game-based learning means learning from experience, socializing while learning, and changing learning by introducing new elements that are seen as fun by the children.

**Table 2.** Teachers’ views on the importance of game-based learning in elementary education

Master’s degree	Improves learning, learning to understand, developing skills (problem solving, critical thinking), opportunities to integrate teaching purposes, any skill and or behavior can be tested through games, finding the sense of the game for children.
Bachelor degree	Developing social skills and relationships, achieving learning goals, fostering interest in learning, improving pupil learning.

From interpretation of the teachers’ answers in Table 2, it can be seen that the importance of using games in teaching focuses on the achievement of learning objectives, improving learning, and developing pupils’ skills, but that the goals of some teachers vary.

A teacher with a Master’s degree stated trying to make the children find things out themselves. The teacher did not considered themselves as someone who simply creates motivation through games and transfers information, but believes that it is not important for children, explaining that;

I try to get a sense of the game from the children, and I do this by asking: Why should you do it?, What is your purpose?, How you can get there?, and How you will find the way to get there?

and then we play that game. Another teacher added that while the curriculum requires teaching and learning in a practical way, that their results should be instantly measurable, and that game-based learning provides the best opportunity to test each skill and behavior.

While one of the teachers with a Bachelor’s degree emphasized that school play is very important for children to understand that schools are not only about rules, questions and answers, but also fun, awakening children’s interests, and that this interest is enabled by setting the context of game-based learning.

**Table 3.** Teachers’ views of game-based learning activities most frequently applied in elementary education

Master’s degree	Games for kids with special needs, encouragement games, problem solving, card games, Lego games, writing and reading development, communication development, spare time games, competitive games, logical thinking development games, and video games.
Bachelor’s degree	Competitive games, Lego games, memory games, motor skills games, concentration games, something to research games, logical thinking games, writing and reading games, social games and communication games, problem solving, card games, and video games.

Table 3 shows that all of the participants agreed on the use of competitive games, games for developing logical thinking, video games, writing and reading development, communication development, card games, Lego games, and problem-solving games. Most of

the teachers explained that they mainly used game activities from Montessori materials, especially for children with special needs, and also for encouragement games. One teacher with a Master’s degree stated often letting children choose what to play during their spare time, believing that some games were too basic for them. Some teachers with a Bachelor’s degree pointed out that they applied a lot of memory games, motor-skill development games, and concentration games. One of these teachers emphasized games to research something, and said that pupils do not always have to practice the knowledge that others have discovered, but through the frequent use of exploration methods pupils can become future discoverers.

**Table 4.** Examples of instructional games that better integrate into teaching content

Master’s degree	Card games in English language classes (repeating new words through mime so pupils think and reflect), games of various forms for the development of logical thinking, often in mathematics (pupils in groups use shapes to construct objects shown in figures, and have to find a way that leads them to the final form), label games in language classes and integrated subjects (e.g., finding negative and affirmative sentences), and clothesline (teaching of characters in language and math classes).
Bachelor’s degree	Label game for learning letters, games for calculating math problems, drama player (when producing fashion shows, where two teachers work with two groups of pupils; one group designs the show, while the other group does the acting, and then they write the story, costumes, etc.), Lego games where they learn addition and subtraction (e.g., build a house and calculate how many bricks to add and remove).

Table 4 shows that teachers use types of games that they consider to be important, especially in language-based subjects such as tag games, and then integrate them into science and math subjects. One of the examples explained by teachers with a Master’s degree is the label game in language classes, where on one side of the sheet it says “I do the tasks” and on the other “I don’t do the tasks,” and by opening and closing the sheet the pupils learn the affirmative and negative sentences, after which the pupils create 10 new affirmative and negative sentences that they then have to present back using sheets of paper that are cut and colored, and then they discuss and compare.

Some of these teachers reported card games in various forms, while most teachers with a Bachelor’s degree mentioned calculation games, drama player, and Lego.

One teacher with a Bachelor’s degree explained the clothesline game, whereby the lesson begins with a song about the autumn season, then they take a rope and use colored sheets of paper for hanging up the pupils’ thoughts on what they sang, what are the characteristics of autumn, and then relating them to adjectives. While one teacher with a Master’s degree gave another example for the subject of mathematics; when pupils learn addition and subtraction, they play with fingers and sticks so as to develop their motor skills, and when they ask children 2 weeks later to subtract or add, they know how to do it without using their fingers or sticks.

**Table 5.** Teachers' views on how they select instructional games used in the classroom

Master's degree	Think and choose, pupils' interests, match to curriculum, pupils' needs, pupils' level, and pupils' needs according to learning objectives.
Bachelor's degree	According to the level of pupils, relational to other subjects, teaching characters, according to learning objectives, and relational to learning goals.

From Table 5 it can be seen that the teachers with Bachelor's and Master's degrees adapt the games of instructional characters, but also adapt the game to the needs of the pupils and their level of knowledge. However, most teachers with a Bachelor's degree explained that this is where the secret to choosing games lies, not to always use the same games, but to incorporate as many ideas from different subjects as possible, to generate the pupils' interest and relate it to the learning goals. Some teachers with a Master's degree reported the new "think and choose" model that has begun to be implemented this year in schools, according to which children can choose what they want to play as soon as they come to class, and this works very well.

**Table 6.** Teachers' views on difficulties of game-based learning in elementary education

Master's degree	Time management, pupil outcomes are not always as planned, preparing teachers with new game ideas, pupil behaviors, and managing activities.
Bachelor's degree	Time management, sometimes pupils cannot handle losing games, pupil outcomes are not always as planned, teachers' effort and skills in designing different games, and pupils with bad behavior.

Table 6 shows that teachers' problems center on time management, teachers' skills and effort in designing different games, pupils with bad behavior, and that pupil outcomes are not always as planned. One teacher with a Master's degree said that "I often apply outdoor games with one group of pupils in the classroom and the other outside the classroom, and we're not always two teachers in the classroom; this makes it difficult to manage activities." Some teachers with a Bachelor's degree said that during competitive games, some pupils find it difficult to accept losing, and that they try to make them understand and learn that it is a part of life.

### Discussion and Conclusions

In general, the teachers defined game-based learning as learning by having fun, learning by doing, and learning through activities. Even in the literature, Game-based learning is defined as lessons which are competitive, interactive, and allow learners to have fun while gaining knowledge (Diamond, 2003). The teachers focused on the fact that games motivate children, and when teachers set learning goals for games, children feel that they are having

fun while they are learning. This means that pupils play together while learning, especially when learning something they cannot easily learn.

Teachers emphasized the importance of game-based learning, mainly for achieving learning objectives, improving learning, and for the developing of pupils' skills. The teachers explained that the importance of game-based learning lies in letting the children find the sense of the game themselves. Most teachers use games in order to obtain pupil outcomes, i.e., games through which children have fun, express their emotions and skills, and have no fear at all. Game-based learning has been found to promote a positive attitude towards learning and to develop memory skills, along with its potential to connect learners and help them build self-constructed learning (Cojocariu & Boghian, 2014).

During games, teachers put the context of learning into many things that children know or do not know; in most cases they do not understand that the teacher is evaluating them, or that they are evaluating each other. The teachers also reported that while the curriculum requires teaching and learning in a practical way, and that their results should be instantly measurable, it is clear that games should be as attractive as possible for the children in order to convey the desired information and reach the set goal. The researcher's observations also showed that applying games within the classroom setting was common practice in the schools studied.

The teachers used competitive games, games for developing logical thinking, video games, writing and reading development, communication development, card games, Lego games, and problem-solving games. Game activities from Montessori materials formed part of the work for all the participant teachers. The results of the current study showed that teachers apply activities according to the age of their pupils. Thus, in the first two grades they used games from Montessori materials, and other games for the third grade. Additionally, logical thinking was used more in math, while experimentation and something to research games were used in science classes in order to explore something, because pupils want to know what the results are, but not just to receive answers from those who previously discovered them.

The teachers with a Master's degree indicated that they used game activities during their leisure time, and that they allowed the pupils to choose their games themselves. The use of games in "leisure activities" and "physical games and activities" encourages reflection and understanding of learning (Ucus, 2015).

From the examples of the activities provided by the teachers in the current study, it was understood that games were more integrated into the development of literacy, which is considered very important and fundamental for the lower grades. Also, that they could be integrated into any subject, as well as in a variety of activities of competitive problem-solving and motor skills development games, where children can win or lose, because often one is faster or better, and they can acquire more points, or vice versa, and that they should also learn about losing as a part of real life, but not to practice it too often.

The teachers with a Bachelor's degree also explained drama-based play, where pupils read stories, create plays, share roles, choose costume designs, and perform, and this is seen as being great for children because it looks and feels like a show. Therefore, the importance of game-based learning lies in touching, feeling and seeing in order for something to remain in the pupil's mind. Thus, the emphasis is on concrete tools, which make children practice and therefore less likely to forget. The researcher's in-class observations noted that they

possessed so-called game labs, with different concrete tools like objects, pictures and shapes of different materials and type.

Most of the games that the teachers practiced in the classroom were selected based on pupils' needs and knowledge level, and were of an instructional character. The teachers said that based on the learning topic, they would explore ideas on how to integrate them into different games, objectives, outcomes, and competences, and that they were committed to finding out how those objectives could be achieved. The results of those teachers with a Master's degree identified the new "think and choose" model, which has just begun being implemented at one of the schools, and provides children with the opportunity to choose what they want to play as soon as they come to school.

Teachers from both education levels agreed that they adapt the games in their lessons to the curriculum, but do not only play games in order to meet the demands of the curriculum, yet also develop the children's logical thinking and skills. It can be said that in addition to the teaching content, the wishes of the children were also taken into account, and that it is possible to combine the two where the lesson plan is quite open.

In general, the teachers experienced difficulties in managing time, pupils with poor behavioral standards, and in not always achieving the intended results. They also highlighted their efforts and challenges in the ongoing quest to design games to be played, how they could be played, and whether or not they could be included, given that pupils have different interests and needs. Another consideration for the teachers was that each time teachers should make it sufficiently interesting in order to stimulate the pupils' curiosity for learning, and that this presented a challenge for the teachers. On the other hand, certain activities have to be separated and led by two different teachers, which is sometimes a problem as two teachers are not always able to be present in the classroom.

Based on the researcher's observations in the current study, game-based learning is common practice among teachers. This is also confirmed by a question asked of the pupils during the observation, "How often are games applied in the classroom?" to which the pupils had no answer. The teacher explained that pupils find it difficult to distinguish when they are playing and when they are learning, because they are constantly engaged in game-based learning.

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