An Innovative Approach to the Current Educational Challenges - Game-Based Learning in the 21st Century

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Abstract

The teaching and learning needs of the 21st century have changed significantly from those a few decades ago. Changing economic conditions, new technologies, and labor market demands have changed the competency expectations. There is an increasing emphasis on independent creative work, critical thinking, and collaboration. Competence development and effective education of both children and adults is a central issue in pedagogy. An appropriate tool for this is games, which is an internal learning method for man. Playing is a genetically encoded activity that does not need to be taught and is not necessary to encourage in the case of a healthy child. Our research focuses on the methods of game-based education, and we explored what effective teaching and development approaches are there through games and how cognitive skills can be developed. During our work, we develop and test various movement-based and board games, about which we conduct surveys and practical examinations. From this, we have concluded that at the present which are the games that perform best in competency development and individual development in general. The research result here to be presented is based on the Castle of Mind (COM) board game we have created which, besides being an enjoyable game, also functions as an educational aid and development tool. Based on our research results, playing with COM effectively develops concentration, logic, relationship insight, critical thinking, and problem-solving skills. The game is one way to develop competencies effectively and in a lifelike way through playing, which is a very effective development tool. We found that game-based learning is a viable and effective competence development method for both children and adults, provided that the basic rules of the game are contained in the rules or framework of the educational method.

Key words: Castle of mind; competence development; educational methodology; game-based learning

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1. Introduction

The economic conditions that have changed in the 21st century, the rise and spread of new technologies, and changing labor market habits have changed what competencies and soft skills are needed in society, on the labor market, and in general to get by in everyday life (World Economic Forum, 2020). With this, teaching and learning needs have also changed significantly compared to a few decades ago (Sala et al., 2020). The effective development of appropriate competences has become a key issue for society as a whole. One of the most effective ways of development - both in childhood and in adulthood - is game-based education.

1.1. The usable knowledge

Based on the latest research and surveys, it can be said that for the 21st century, society and the economy do not need a workforce with vast lexical knowledge, but rather people, a workforce who are flexible, creative, able to handle and solve problems, and can think critically to approach challenges and problems (Sala *et al.*, 2020). The importance of the development of competences is constantly increasing, including skills related to cooperation (Zeide & Odiņa, 2020). The development of skills, abilities and competences poses challenges in the field of education. Social and labor market needs are met when there are more and more people with the appropriate competencies, and achieving this is largely the task of education. It emerges from the needs what requirements these areas have to face in order to create and strengthen a knowledge-based society with competencies that meet the challenges of the age. Great emphasis is placed on the development of independence, independent work, quick and efficient processing of information, critical thinking and the development of skills and abilities related to thinking in general, the ability to solve problems, and the development of competencies related to cooperation between people. And that the education of the young generation – including vocational training and adult training – support the achievement of these goals (European Parliament, Council of the European Union, 2006).

The competence development and effective education of both children and adults is a central issue of pedagogy. Today, the development of competences is given a more prominent role in school education, so that the rising generation already has the necessary competences when they enter the labor market (European Parliament, Council of the European Union, 2006; Qian & Clark, 2016; Scaife & Rogers, 1998). In order to do this, it becomes necessary to use teaching and training methods and auxiliary materials that can develop abilities and skills in the most effective way (Kafai, 2012; Scaife & Rogers, 1998; Seaborn *et al.*, 2012). Dealing with today's new challenges requires a unique approach, which requires the development of new, innovative forms of learning, the use of new teaching and learning tools and technologies. Complex methodological developments and a change of attitude are needed. The key to an individual's learning and development process is motivation and its independent maintenance. Make learning and development attractive: let all age groups see the value of knowledge and love the learning process itself. For this, it is necessary to update the educational methods.

1.2. The concept of competence

The concept of competence can be defined in several ways. Some examples are: *Competence* (practical approach): the demonstrated ability to apply knowledge, skills and personal, social and/or methodological abilities in work or study situations and in professional and personal development. *Competence* (based on the wording of the EC): "combination of knowledge, skills and attitudes" appropriate to a context, "the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development" (European Parliament, Council of the European Union,

2006). *Competence* is "a set of mental processes related to creative and critical thinking to develop new strategies for solving challenges and processes" (Saiz-Alvarez, 2019).

During our research, using the approach of philosophy, we came to the conclusion that, in a general sense, *competence is the ability to use certain opportunities*. These opportunities are partly born with man, partly acquired through environmental influences, partly learned, partly realized during development. Based on these, if a person is competent in a certain subject, it means that he sees opportunities in that area and is able to take advantage of them.

1.3. The game as a competence development method

Methodological research shows that among innovative educational methodologies, the game is one that proves to be an extremely effective development tool in many fields (Guzdial, 2016; Harackiewicz et al., 2014; Kafai, 2012; Qian & Clark, 2016; Spieler & Slany, 2018; Tzuo *et al.*, 2012). Regarding the game, we found that *the game is a practical learning process in which development appears naturally and life-like*.

It is *practical*, so the individual participates in it, it happens through her, she brings her own actions into it and in the process gains real experiences.

It is *natural*, because for humans, play is a genetically coded activity that does not need to be taught, does not require external stimulation.

It is *realistic*, as the game operates with situations similar to everyday life. With such familiar situations where we can try several decisions and strategies without the real consequences occurring, but the consequences still become visible. In this way, we can learn, among other things, to make decisions effectively, to approach topics from different sides, to try new things, and so on.

We can use the knowledge tested and acquired during the game and the competences developed with benefit in our lives and in practice. For this reason, it can be said that the game is not only suitable for entertainment and recreation, but it is also an effective development tool, the effects of which are effective in practice.

In the first period of a person's life, he develops his movement and nervous system through play, and builds and develops brain-nerve-muscle connections (Freedman *et al.*, 2001; Harackiewicz *et al.*, 2014; Mavroudi *et al.*, 2022; Tzuo *et al.*, 2012). From the age of 7-10 years, the emphasis from the initial physical stage shifts to the mental one: the instinctive development of cognitive abilities. This is when the focus is on the development of connections connecting different areas of the brain: logic, memory and perception development games appear (Freedman et al., 2001; Takeru et al., 2018). In humans – as in many other species – the desire to play remains into adulthood and can have a similar developmental effect as in childhood.

Many research now prove that games as developmental tools are of outstanding importance in learning and teaching processes, both for children and adults (Harackiewicz *et al.*, 2014; Qian & Clark, 2016; Seaborn *et al.*, 2012; Spieler & Slany, 2018; Tsai, 2012). Games played an important role in the school curriculum. In addition, game-based education and learning with games have proven to be a particularly effective development and teaching method among adults as well (Seaborn et al., 2012; Spieler & Slany, 2018; Wu & Wang, 2012). The authors have drawn motivation from several papers published on the developmental effects of games and also the possibility to develop competence using game-based learning techniques. Seaborn et al. (2012) have found that a game-based curriculum has had a positive, statistically significant effect on concept comprehension. Wu and Wang (2012) have conducted an in-depth review of game development based learning tool and projects, and have found that games have the power to help students to learn different curriculums. Spieler and Slany (2018) looked into the gender differences in IT related fields and found that game based and game development based learning approaches can in practice Bevčič *et al.* (2020) have looked into whether specific board games are suitable for competence development and found that they are indeed a viable tool. It can

therefore be said that play can be one of the methods of effective and life-like development of competences both in childhood and adulthood (Bevčič et al., 2020).

1.4. Patterns or the development of thinking?

Most of the competence development methodologies and tools currently used in education are primarily based on the transfer and learning of samples and templates (e.g., assertive communication, body language training, etc.) (Jedrinović *et al.*, 2019; Mavroudi et al., 2022; Zapušek & Rugelj, 2014). The disadvantage of learning by copying samples is that the individual acquires template answers and solutions, but in most cases, he does not know their working mechanism and why it works that way. The types of training that offer samples and templates initiate the pattern-copying learning model, which is based on the innervation of movement patterns through brain-nerve-muscle connections (Freedman et al., 2001; Takeru *et al.*, 2018). With a small number of repetitions, the individual can start the learned response, and after a large number of repetitions the pattern is fixed (Cavaco, 2014). However, the patterns and templates can only be used in specific situations - as responses to the situations for which the patterns have been rehearsed. The individual has no answer to a situation different from the rehearsed situation.

Research shows that the development of attention and skills requires a completely different approach than "traditional" training. These areas to be developed cannot be treated as independent "subjects". Competence development is not effective, or only very limited, if it is treated as an independent subject, as an independent element of the topic. (For example, independent communication practice often causes alienation, while if it appears during the teaching of a subject, e.g., in the context of a game, it can be very effective.)

Chess and bridge are also popular games in education (Gobet & Campitelli, 2006; Horgan & Morgan, 1986). In school education, these games are now widespread in many places - especially in Great Britain, the Netherlands, Belgium, the USA, and Hungary. Observations show that the use of developmental, strategic and logical games can be started very early, at the age of 8-10. Based on the experts' experience, the beneficial effect of bridge and chess games is also shown in the development of attention skills, as well as in the students' better math and text interpretation results (Fried, 1992; Gobet & Campitelli, 2006; Horgan & Morgan, 1986). According to the observations of the schools, by using developmental strategic and logical games, certain intellectual (planning, mental arithmetic, insight, analysis, evaluation, etc.) and social skills (foresight, time management, cooperation) can be developed within a playful framework (Bevčič *et al.*, 2020; Carbonaro *et al.*, 2010; Fried, 1992; Gobet & Campitelli, 2006; Horgan & Morgan, 1986; Qian & Clark, 2016; Spieler & Slany, 2018; Wu & Wang, 2012).

Among the above two possible directions of development, it can be assumed that the latter leads to the real development of competencies. Learning the patterns is suitable for learning the answers used in certain situations and applying them, not necessarily for developing basic skills, key competencies and attention.

As can be seen from the example of chess and bridge, properly selected or structured games are suitable for developing thinking and its various aspects (creativity, switching speed, elements of critical thinking, etc.) and attention (Mavroudi *et al.*, 2022). It is revealed that students today typically have very short attention spans. They reach their maximum information capacity very quickly, from which point they are unable to acquire long-term knowledge. Without regular repetitions, participants of traditional training forget 90% of the information within 30 days.

The weakening and deterioration of attention is the source of many problems at the social level. These include, among others, lack of motivation, burnout, and a decrease in efficiency at work. It can be said that attention is one - if not the most important - area in the world today that needs development, both for children and adults.

1.5. Development of developmental games

In order to be able to develop a game that develops certain skills, abilities, and competences, knowledge of two basic operations is necessary. On the one hand, we need a thorough knowledge of the operation of the given area, since the goal is to develop it (Török-Szabó, 2017). On the other hand, we need the knowledge of the development process itself (Török-Szabó, 2020) since this enables development to take place during the game. Based on this knowledge, it is possible to create, among other things, games that aim to develop thinking and attention. The description of the functioning of thinking, attention, and development can be found in the model of The Theoretics (Török-Szabó, 2017) in relation to each other. The developmental effect of the practical tools created on the basis of these can be verified in practice by research examining the use of the tools.

Castle of Mind (COM) is an abstract strategy-logic board game specifically aimed at the development of thinking, created as a result of the research. The game was created specifically with the aim of developing the player's cognitive abilities while playing with it, and at the same time also maintaining the gaming experience: developing while having fun. From the very beginning of the development of the game, the primary goal was to use it for school purposes, and also to make it playable, usable and developmental for adults as well. We examined the development effects experienced while using COM both during the development of the game and afterwards, after the game was released on the market.

2. Materials, experimental approach, and methods

When developing the Castle of Mind game, the goal was to create a development tool based on methodological research, the use of which develops multiple competencies at the same time, and at the same time fits the needs of the users and the culture of board games. The key lies in creating game mechanics. In the case of COM, we did not choose one of the already existing game mechanics, but started from the knowledge of the theory of thinking-action-consequence, and the mechanism according to which the game works was built on this model. This resulted in a completely new approach, a new type of game mechanics, to which we adjusted the structure of the board and the gameplay, the final rules of the game, during both the development and testing phase.

Based on the preliminary surveys, several areas were selected that could be improved among children, young people, and adults. Among these, the primary area was *attention*. In addition, in connection with thinking, other investigated areas included, among others, the ability to organize and combine, strategic thinking, critical thinking and others. The detailed list of areas is included in the Discussion section. All of these areas are useful skills and abilities in the modern age, where the insight into complex systems, the ability to plan and make decisions increases efficiency, and in many cases - e.g., in certain workplaces and positions - are also expectations.

The game is designed to give you the opportunity to develop all these areas. We examined the impact of the use of the game on the areas listed above in the framework of research, both during the testing phase and after the finished game was put on the market. Additional considerations during the development of the game were:

- abstract - the basic game has no specific theme or story (note: later products of the COM game family are themed games that are based on the same game mechanics discussed here),
- all elements of the game have been designed in such a way that attention must be constantly maintained in order to win (e.g., the graphics of the two teams' pieces, the layout of the fields, etc.),
- there is no random in the game - everything depends on the players' thinking and decisions.

As a result of research and development, we have created a tangible development tool based on scientific foundations that fills gaps in both the gaming and educational sectors and is suitable for the effective development of these abilities. When applied together with game-related knowledge and methodology - for example in education - efficiency can be increased even further. In addition, it is fun, able to create a community, and also creates opportunities for several generations to relax and play together. And its regular use creates an opportunity to avoid problems such as attention deficit disorder, decrease in concentration, and, as a consequence, the deterioration of human relationships, loneliness, burnout, mental and other health problems (Blazer & Wallace, 2016; Bonnechère, 2018; Wang *et al.*, 2021).

3. Results

As a result of our research, the COM game mechanics was created, and the first game to use it is the 2-player Castle of Mind (COM) abstract logic-strategy board game. The game was created using the results of the above research, so its operating mechanism is based on the model of consciousness described in The Theoretics. It can be considered as a way of applying the theory in practice. The game and its associated methodology are a new skill development and learning support platform.

Figure 1. Pieces of the game: A total of 17 pieces per player. Broken down into colors: 4 yellow, 3 green, 3 blue, 3 red, 2 gray, 2 white pieces. One team's pieces are a black circle on the outside, a dot of the given color on the inside; the pieces of the other team are indicated by a colored circle on the outside and a black dot on the inside
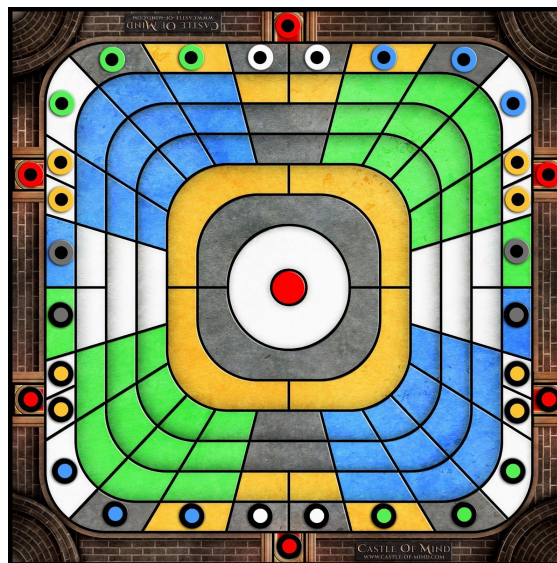

Figure 2. Castle of Mind (COM) abstract logic-strategy board game (the pieces stand on the starting fields). Board: size: 30x30 cm, 106 fields with different shapes and sizes, in 6 different colors (12 yellow, 26 green, 26 blue, 7 red, 14 gray, 21 white). The arrangement of the fields is specific, one field is in contact with a variable number of other fields

2.1. Description of the game

The board: size: 30x30 cm, 106 fields with different shapes and sizes, touching each other in various ways, in 6 different colors (12 yellow, 26 green, 26 blue, 7 red, 14 gray, 21 white). The arrangement of the fields is symmetrical, but one field is in contact with a variable number of other fields.

The pieces: 17 pieces per player, 4 yellow, 3 green, 3 blue, 3 red, 2 gray, 2 white. The pieces of one team are indicated by a black circle on the outside and a dot of the given color on the inside, while the pieces of the other team are indicated by a colored circle on the outside and a black dot on the inside. This signaling method and the number of pieces are deliberately designed so that it requires constant attention during the game to know which pieces are on the board and which of them are ours and which are the opponent's.

The game has no specific theme or story, it is an abstract logic-strategy game. Two players can play against each other, the goal is to get the red piece to the middle square - and to prevent the opponent from getting his red piece to the center. The players can move alternately, move one field in one round with one piece, in accordance with the given rules for moving and hitting.
Game rules:

To start, the pieces need to be placed on the starting fields (the starting fields are marked with which pieces are placed on which fields). The red pieces must be placed on the red fields on the edge of the board. During the game, each piece is located on one of the fields (a colored area bordered by black lines), and only one piece can be on a field at a time.

Which player starts the game is a matter of agreement.

Players take turns. You can move from one field with the piece to any field with which that field is in contact - the contact of the corners also counts.
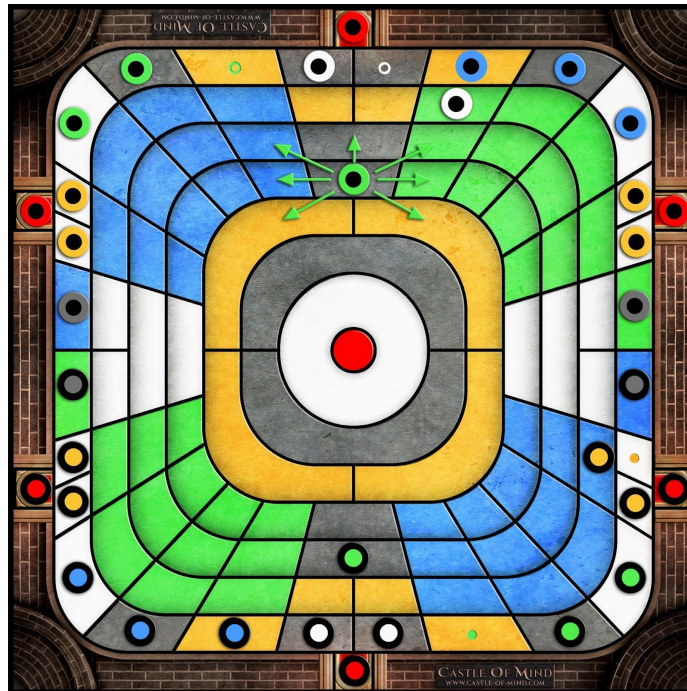

Figure 3. The green piece's move options from the gray field

Some fields touch more fields, others less, depending on the layout of the board. If a piece is on a field of the same color as its own, it cannot move from there to another field of the same color. (E.g. if the green piece is on a green field, it cannot move from there to another green field.)
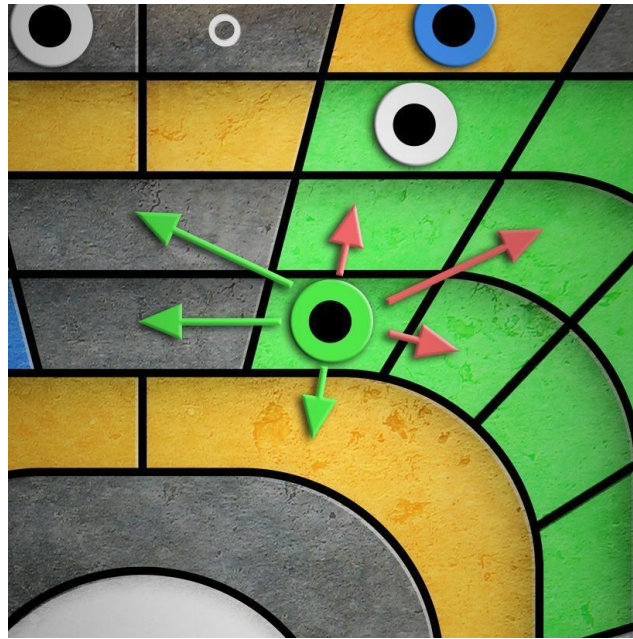
Figure 4. The green piece's move options

There are no "halves" or "half fields" in the game, that is, during the game any player can move to any field anywhere on the board - except for the red starting fields.

Only a red piece can enter the central red field.

Only red pieces can stay on the red starting fields, and only until they leave it. If the red piece has moved from the red starting field, no piece can enter it. If a piece moves to a field of the same color as its own, it can remove one of the opponent's pieces that is also on a field of the same color. (E.g., if a green piece enters a green field, it can remove one of the opponent's pieces that is also on a green field.)
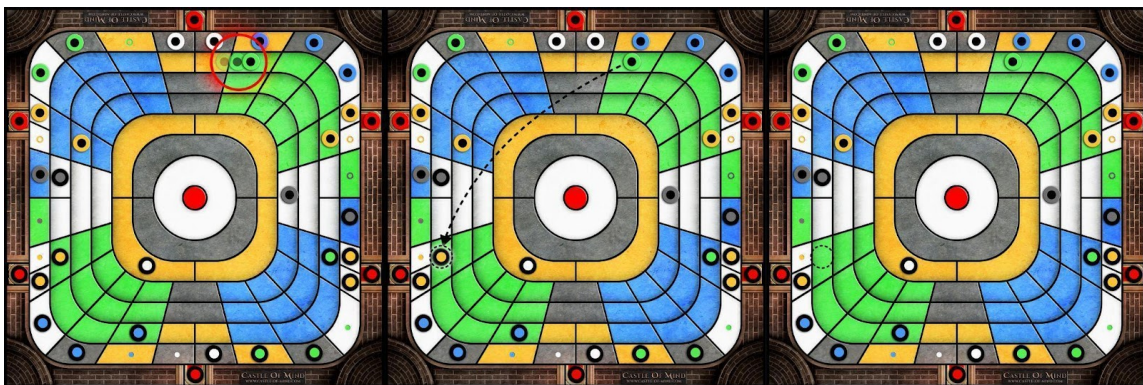

Figure 5. The hit: the top green piece moves to the green field, so you can remove one of the opponent's pieces that is also on a green field

It is compulsory to hit in the game - so if someone moves to a field of the same color as the color of the piece, they must take a piece from the other player if they have pieces on the fields of the same color.

The goal of the game is to get your own red piece to the red field in the middle of the board - and to prevent your opponent from reaching this with his own red piece.

The game ends in the following cases:

- if one of the players can get a red piece into the middle red field - in this case he wins,

- if one player takes all three of the other's red pieces - in this case, the player who took the other's red pieces wins,
- if one player cannot move with her pieces on the field because she was pinned down (cornered) by her opponent's pieces - in this case, the player who pinned down the other side wins.

(Example of pinning down: One player has only one piece left, which is red, and is still on the starting field. This field - like all red squares - has two adjacent fields. If the opponent's pieces are on both fields, then with the red piece the player cannot move anywhere, and since he has no other pieces, he is stuck and loses.)

3. Discussions

3.1. The COM game mechanics

The essential element of the new game mechanics is that the hit does not occur where the step that creates the hitting position. For this reason, in the pursuit of victory, it is necessary to constantly keep in mind the entire field, the colors of the fields, the colors and positions of the pieces, the move options and variations, your own and the opponent's strategy, their changes, etc. The developmental effect of the game can prevail in all these areas.

Among other things, the mechanics - and thus the game's development aspects - are influenced by the following aspects:

Construction of a playground
- The board is colorful - the colors on the board, the arrangement of the colored fields and their relation to each other define the playing field, the framework of the game.

Properties of pieces
- Instead of using two types of pieces of different colors (e.g., light/dark) for the players' pieces, several pieces of different colors are available to the players.
- Different pieces don't have different roles - the same rules apply everywhere, including moving, hitting, and when the opponent takes a piece.
- The different pieces do not have a predetermined strength or order of importance - in each case, it depends on the player how much importance he attaches to each piece and piece color.
- One team's pieces have a black edge and a colored center, while the other team's pieces have a colored edge and a black center - it requires special attention from the players to distinguish the pieces from each other, since the other player's pieces are also marked with the same colors.

The relationship between the appearance of the board and the pieces
- The colors of the pieces are the same as the colors of the fields - the relationship between the pieces and the fields determines which fields can be moved to, and on which fields our own pieces are threatened by the opponent.

The relationship between the operation of the playground and the pieces
- Players can decide which pieces and which fields they consider important during the game (and can change this decision during the game).
- The hit does not occur when the pieces meet, but when a piece moves to its own color - then you can take down one of the opponent's pieces that is also on a field of the same color.
- Which of the opponent's piece the player takes down when hitting is independent of where the hit took place, the took down piece may be far away in space.
- The possession of the fields also plays an important role in the game, since there can only be one piece on a field.

The relationship between the playing field and the appearance of player pieces
Correlation between the fields of the playing board and the appearance of player pieces:

- The color of the piece matches the color of at least one field on the board.
- The color of the marking of the marked fields is the same as the color of one of the pieces.

The unique game mechanics are suitable to develop an individual's attention, cognitive skills and abilities at the same time when playing the game.

3.2. The developer impact of COM

During the assessment of the development effect, we examined the effects of regularly playing with COM in the case of more than 100 players aged between 16-57. We primarily monitored changes in the following areas over several months:

- Organizing ability (recognizing the relationship between elements, arranging elements into a system, recognizing a system)
- Combining ability (creating relationships based on regularities)
- Converting ability (switching between systems)
- Predictive ability ("foresight" ability: taking into account next possible steps, weighing between them)
- Logical ability (conclusion, rulemaking)
- Communication skills
- Strategic thinking (longer-term planning of actions)
- Concentration (maintaining and focusing attention)
- Spatial vision (perception of the spatial location of objects and the observer)
- Critical thinking (a complex way of thinking consisting of many factors)

During the research, the participants regularly played the Castle of Mind game - either with each other or with other opponents - and the researchers assessed the current state of their abilities and skills in tests at regular intervals. In addition, most of them were able to talk about their experiences. Players have improved in most areas. Concentration, i.e. the time during which one can maintain attention, started at a higher level in the case of adults, but in the younger age group, under the age of 20, it increased to a greater extent over the course of the months. In terms of proportions, less spectacularly, but also in the case of adults, the time until they are able to concentrate on one thing has increased. The explanation for this is that the game requires concentrated attention in order to win, and also to be able to extend our attention to more and more areas and more aspects of the board.

There was a strong improvement in logical and predictive abilities, strategic thinking, and ability to combine. Typically, in the first month, the game brought a small amount of development in these areas, and then from the second month onwards, the level of development gradually began to increase. Based on the interviews, it is assumed that the reason for this is that after learning the rules, after the initial learning curve, and getting to know the game, the players pay more and more attention to the gameplay itself and see more and more opportunities in it. Foresight can be improved from game to game. While players typically see fewer possible next moves during the first games, over time they are able to think more and more steps ahead and can keep in mind more and more possible move variations and responses to them at the same time. The layout of the fields and the number of pieces present a serious challenge to the players in this field (e.g., compared to chess, there are many more variations of moves in each state, so there are many more possible options for further progress). This significantly improves the ability to combine. Strategic thinking, i.e., the planning and implementation of several coordinated moves follows all this, the more experienced players had a serious strategic set - from the defense of the fields to the "chief sacrifice" (when they get a strategic step advantage by sacrificing a red piece), etc.

The game also requires flexibility, since the opponent's moves and decisions always influence whether someone can carry out a strategy, or whether he needs to change his strategy as the game changes over time. This is helped by the fact that the pieces do not have a predetermined "value" (apart from the red pieces), so any color, piece or field can be assigned a strategic importance and changed on the fly. It is likely that spatial vision can also be improved by regularly playing COM. According to the reports, the perception and assessment of the spatial location and distance of objects improves - the investigation of this can be the subject of further research. In terms of critical thinking, most people experienced a clear improvement, especially in terms of interpreting tasks, drawing conclusions, checking, and revising. They were able to assess each task and problem more thoroughly and carefully, they were able to take several factors into account, and they left their decisions less to chance or other external circumstances.

3.3. The usefulness of the COM developmental effects in everyday life

Our basic learning mechanism is based on patterns. As a young child, we learn movement patterns and then behavior patterns. Pattern learning is necessary up to a certain level. Due to the large number of possibilities in the Castle of Mind game, the player thinks about new solutions and tactics from the first minute, tries to analyze the given situation, the risks and makes the best decision based on those possibilities.

In order to play successfully and strive for victory, it is necessary to see the entire board and the underlying connections. This requires the cooperative work of the right and left hemispheres of the brain; thus, the game develops and strengthens the neural connections between the hemispheres. All this is useful in many areas of life, for example in complex problem solving.

The rules are straightforward and clear, and logical skills can be developed by following them. At the same time, since many options can exist at the same time, the player also makes intuitive decisions in some cases. Using the two together also helps the player to look at the world comprehensively, to make decisions, to solve problems, and to use both types of thinking in order to achieve their goals.

The player can also learn what later effects a move can have either on the player's further options or on the opponent's moves, as well as the consequences of each decision and action. Through this, the player can acquire the knowledge that his decisions and actions always have an effect in reality and always lead to consequences, which can always be traced back to his previous steps and decisions. The unique hitting mechanic also leads the player to realize that often the effects of certain actions do not become visible directly where the action took place, but far away in time and space.

The wide variety of possibilities and factors that appear in the game teach the player how to effectively manage the many incoming stimuli at the same time. This is a very useful skill in today's world of accelerated information flow. It develops an overview of the possibilities, the weighting between them and decision-making, the game thus helps the overview of real situations and the processing of incoming stimuli in real time.

4. Conclusions

It is a common social goal that the individuals who make up society can adjust between the many stimuli and information they receive at work and in their private lives. To see situations and opportunities as quickly as possible and to be able to respond to them in a way that suits them - and their own goals. Dare to make decisions, see the consequences of their decisions, actions, steps - even if it does not occur where the specific action took place. In addition, to the best of their ability, they should also contribute as creators of society, serving the progress of the world, contributing to the development of humanity with new knowledge, creations, inventions, innovations, and solutions to problems. The Castle of Mind game is suitable for developing the

competencies necessary to achieve all these goals. Based on our current knowledge, there is no similar game on the market.

Thanks to the unique development, the game can spread widely. Its primary target audience is school and secondary school students, young people intending to enter the labor market, but the game can contribute to the building of family, school and workplace communities, to the development of workplace competencies, they can contribute to the prevention and treatment of certain mental phenomena (attention deficit, dementia), and it is also used successfully in post-COVID rehabilitation. With regular play and the application of established rules, cognitive abilities and skills are easily adapted to the situations that appear in everyday life, in the rapidly changing, challenging world.

The game is suitable to be used in either formal or informal educational setups. The typical playing time is between 20-40 minutes, which can be included in the curriculum as well as in extracurricular activities. The recommended minimum age for COM is 8 years, but we received feedback that children of 4-5 years can already understand the rules of the game and they like to play it especially due to its colorful design. The rules of COM are currently available in X languages, however, the rules are simple and easy to translate to other languages. The game is available to buy online and currently ships to Europe. The COM game started out as a boxed board game, but in the meantime, the online version of the game has also been completed and is being prepared to launch publicly.

Based on our research results, regular play with COM effectively develops attention and many skills and abilities related to thinking, including logic, strategic thinking, organizing ability, and critical thinking. One of the most effective methods of effective and practical development of competences is the game, which is a very effective development tool. This makes game-based learning a feasible and effective method for both children and adults. All in all, it can be said that Castle of Mind not only develops the competences related to thinking, but as a popular game, it also makes it attractive to think.

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