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BoConTeam
Boosting Contemporary Teaching Methods for Europe

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"Boosting Contemporary Teaching Methods for Europe"

BoConTeam4EU

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C3 Game-Based Learning in Adult Education

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1. What is Game Based learning

Game-Based learning, or GBL, is an educational approach that uses games (often computer/video games) to teach students in a fun, engaging and motivational way. GBL integrates learning and game play, so that the learning objective is integral to the game, and the game is an integral part of the learning process. A major goal of GBI is for students to enjoy the learning process, and learn more effectively.[1]

By game-based learning, we mean games that have an explicit purpose for educational content and applications. These games can be adopted for various learning situations and should foster different learning processes for individual learners in both formal and informal contexts.

1.1. Understanding Game-Based learning Approach in Education

Gone are the days of textbook-only learning. As an educator, you've likely experienced firsthand how challenging it is to meet the needs of different types of learners — all while trying to keep student engagement high.

Game-based learning is one teaching strategy that's growing increasingly popular to help students achieve their learning objectives.

Especially as:

- Students are becoming tech-savvy at an earlier age
- Educational technology companies are developing more efficacious products[2]

The great thing about game-based learning is everyone can reap its benefits, from preschool all the way up to post-secondary education and beyond. Where and how doesn't matter, either — students can learn:

- With online games
- In person with physical objects

[1] https://edusoftlearning.com/game-based-learning/
[2] https://www.prodigygame.com/main-en/blog/game-based-learning/

- Independently or as part of a team[3]

Game-based learning is a teaching method designed to incorporate the learning subject with gameplay. In this method, students and teachers play games that may contribute to the learning experience by simplifying and exemplifying certain subject matters and concepts. The purpose of game-based education is to qualify students to apply the abilities they obtain during playing to real-life scenarios.

Game-based learning in the classroom provides a safe and comfortable environment for children to make mistakes, take actions, practice behaviours, and experience the consequences of their choices without taking real-life risks.[4]

Digital Game-Based Learning

Didital Game-Based Learning (DGBL) "offers a delicate balance between in-class lessons and educational gameplay. Teachers introduce students to new concepts and show them how they work. Then students practice these concepts through digital games."[5]

A good DGBL platform should seamlessly track progress as students work through subject matter and help identify where students are excelling, as well as where they need support.

1.2. Game base learning in Adult Education

Digital game-based learning and traditional game-based learning are having a powerful impact on adult education, social and cultural considerations, as well as the future development of learning as the use of digital game-based learning and traditional game-based learning in adult education could be beneficial for both learners and facilitators.

Game-based learning requires learners to think differently about concepts and ways of knowing than traditional learning has required. Research has shown that games can be more effective

[3] https://www.prodigygame.com/main-en/blog/game-based-learning/
[4] https://www.twinscience.com/en/parents-guide/why-game-based-learning-is-a-must-for-your-child/
[5] https://www.prodigygame.com/main-en/blog/game-based-learning/

than traditional methods of instruction for promoting positive attitudes towards learning and memory skills. [6]

Think outside the box

Educators could think 'outside of the box' about games and their functions. This approach would allow future learners to bring their skills with them into the adult education classroom. It could also allow learners to feel more competent, independent, and empowered to reconnect their childhood form of learning with their adult learning.

Digital game-based learning could offer adult learners the chance for collaborative learning that takes place throughout the semester in addition to lecture-based classes. There are more hands-on and practical application-based approaches to using games in education that could allow for more personalization of learning, self-directedness, and team or group learning.

Many games involve strategic planning, group cooperation and divergent thinking skills to help promote creativity in the classroom. Simulation games in particular offer students a chance to engage in real-life situations, apply and develop their own problem-solving skills and increase levels of awareness of potential problems, interactions, and conflicts.[7]

[6] Anderson, Bryce O.; Anderson, Michelle N.; and Taylor, Thomas A. (2009). "New Territories in Adult Education: Game-based Learning for Adult Learners," Adult Education Research Conference. https://newprairiepress.org/aerc/2009/papers/1

[7] Anderson, Bryce O.; Anderson, Michelle N.; and Taylor, Thomas A. (2009). "New Territories in Adult Education: Game-based Learning for Adult Learners," Adult Education Research Conference. https://newprairiepress.org/aerc/2009/papers/1

2. The typology of Game-Based learning

Never stop playing

Games are one of the earliest ways people engage in learning; babies and kids play games to discover the world and to learn.

So why, when we reach a certain age, do we stop playing? Why do we find so few examples of games in secondary school and higher education? And, why do most of us stop playing games when we grow up and find a job in a company? If you think about yourself or other adults, you probably know that people enjoy playing games of any sort.[8]

As any adult will know, the older you get the more difficult it becomes to cram new information into your increasingly stubborn cranium. Games can be perfect for making the more aged brain supple enough that it will quickly once again become a veritable sponge, ready to soak up every drop of information it can possibly hold.

Studies have shown that adults take a long time to get warmed up in a classroom, but a game can blow off the cobwebs in the blink of an eye, setting the groundwork for a fruitful lesson. They are often reticent to mingle with classmates, but an interactive game can break the ice like nothing else.

Language learners will be all too aware of how hard it becomes in later life to recall vast lists of vocabulary, but games enable your brain to find more interactive and interesting ways of memorizing said vocab, with special moments and in-game situations harking students back to the words they wish to recount, to that boggled looking waiter or hard of hearing barman.[9]

In order to understand GBL better, its different types can be examined along with taking the following into consideration: the place where the game happens, and the environment in which the students play.

01. Board Games

[8] https://www.teacheracademy.eu/blog/game-based-learning/
[9] https://news.elearninginside.com/how-game-based-learning-is-transforming-adult-education/

Monopoly can be considered an educational game. It has all the necessary elements: a story, characters, points, competition, and many other aspects. There are many examples of Monopoly-like games for schools with modified rules for different subjects, like History Monopoly or Math Monopoly.

N.B. Also in the next 2 types, but especially in board games, preparation of the game (for example, the board and the rules) is really important. Students should be involved in the "building-of-the-game" phase, because it can be highly instructive and motivating. Keep in mind that building an educational game can be a great Project Based Learning (PBL) activity.[10]

02. Real life games

The environment here is the real world. This is probably the most motivating, but also the most stressful type of game. In this kind, students must move, act, use their body and their minds in order to play. This is the most immersive type and it provokes students in almost every aspect of their learning.

Since there is the possibility to move into a certain space, the real life game is often connected to the theatre. It's easy to find role play activities, as well as simulations or drama in this type of game learning. Students act "as if they were" a character of the game, make decisions according to their goals, the environment, and the rules.[11]

03. Digital games

The environment here is online. Digital games can be compared to board games. In fact, a lot of digital programs for GBL use online boards that a teacher can edit or add educational content according to the topic that will be played. Also, in this type of game, students can be involved in the construction of the game, especially if the teacher is not able to manage online tools without their help. Students have a character (but not necessarily an account) that moves through the game where they face challenges that are placed along the games' path.

[10] https://www.teacheracademy.eu/blog/game-based-learning/
[11] https://www.teacheracademy.eu/blog/game-based-learning/

A digital game does not involve skills that are connected to the use of the body and the real space, but it can train students to collaborate in a different and virtual way.[12]

Here is a short example of using GBL for teaching history:
https://www.youtube.com/watch?v=n2EV8nLeBK4&t=2s&ab_channel=Edutopia

2.1. How do games improve adult education

Learning is not the most exciting thing adults have at their disposal. No matter how relevant the content is, it is not something that we as adults have as a priority. Adding a gaming element goes a long way to boost engagement and motivation. The more engaged adults are, the better they will retain the information. With more motivation, they will not treat the learning module as something they need to complete. Instead, they will look forward to taking it.

A well-crafted adult learning game will have characters and a storyline that the target audience can empathize with. When learners associate themselves with the protagonist, they will be willing to go the extra mile to help him or her overcome obstacles weaved into the storyline. They become emotionally invested in the course. Leaderboards bring about a dose of healthy competition amongst adults/trainees. Each one strives to top the board. There are courses that require learners to collaborate and solve a problem. These activities connect and bond peers.

A well-designed game includes a challenge that the learner needs to resolve. The activities eventually tie into the subject matter and provide the learners with the information and knowledge that they need to overcome the challenges. If they make a wrong move, they will be penalized immediately. If they take the right decisions, they get awarded. As a result, the learners get an opportunity to brush up their problem-solving and lateral-thinking skills. These skills boost their productivity and help them resolve issues in their job role.

Game-based learning applies game mechanics to non-gaming context. It presents the regular content in an exciting manner. This makes learning more appealing and enhances productivity. It also aids recall and retention of information.[13]

[12] https://www.teacheracademy.eu/blog/game-based-learning/
[13] https://www.designingdigitally.com/blog/using-games-adult-learning

2.2. Adults' participation in games

Game-based learning (GBL) can be an effective way in which to motivate adult learners and engaging them in active learning experiences. This involves using both digital and traditional games, to support and enhance learning and assessment.

However, much of the research and practice in this field is based on the assumption that learners are children or teenagers, whilst in reality, there is a growing number adults (including mature) who are engaging in informal lifelong learning within the Vocational, Education and Training (VET) Sector.

There are six factors that influence the motivation of participants to engage with games.

a) **Completion** – collecting objects, completing levels;
b) **Narrative** – following a storyline, journeying with characters, discovering what happens next;
c) **Creation** – building things, developing ideas, creating artifacts;
d) **Competition** – achieving things better or faster than other players;
e) **Community** – talking with others, collaboration;
f) **Puzzle-solving** – problem solving, lateral thinking

2.3. Evaluation techniques through non-winning games

Evaluation is an important step in the life cycle of software, once through this practice it is possible to find issues that could compromise the user experience. With educational computer games, the same rule is applied.

A fundamental part of the educational experience, particularly within a game-based learning environment, is feedback. For adult learners, meaningful feedback provides a wide range of advantages allowing learners to get the most out of their educational environment. In many respects effective feedback process' can transform any game-based learning environment into a resounding success for everyone involved.

It is absolutely paramount to provide constructive feedback within a reasonable timeframe so that the adult learner can clearly identify which behaviors or skill sets need to be improved. By doing this, learners can see firsthand how improvements have a direct impact on the learning process and/or results. Showing the learners how their actions or behaviors relate directly to the real world is one of the most effective forms of feedback.

This can be done for example, through scenarios that display the real world implications. It can change behaviors based upon the result of their actions in order to fully benefit from this educational environment.

It's imperative to focus on behaviors, actions, or skills when providing feedback that can be changed or improved upon when making suggestions and offering alternatives. From this, learners not only know where they went wrong, but in turn learn how to fix it moving forward. It is fundamental to tie the feedback back to objectives and goals.

3. Applying Game-Based learning methodology

When it comes to engaging and motivating remote learners, traditional learning approaches have their limitations. Game-based learning can foster learner engagement, encourage motivation and deliver a higher return on investment (ROI) for organizations that embrace it.

3.1. Game-Based learning methods in the course environment

Here are some strategies and techniques that can drive learner engagement and motivation with game-based learning, that should be considered as part of any game-based learning game plan[14]:

1. **Personalized Journeys, Not Prearranged Trips**

   The best way to drive learner engagement is to entice them to go on a personalized journey with you. Instead of following a predetermined course through the game (by, for example, using templates), design game-based learning to deliver an experience that's based on learner preferences. This approach could involve techniques such as personalized game paths, customized characters and avatars, and learner-selected difficulty levels.

2. **Stories, Not Brief Narratives**

   How do popular television shows motivate their viewers to come back for more, week after week and month after month? They weave a compelling story each week. For maximum impact, design your game-based learning strategy around a digital story with a purpose, rather than using a multitude of disconnected single narratives.

3. **Learning, Not Winning and Losing**

   Games produce winners or losers — except in a GBL context! Make learning the primary objective by giving learners multiple opportunities to "lose" without the dreaded "game

[14] https://trainingindustry.com/articles/content-development/5-strategies-for-using-game-based-learning-to-drive-learner-engagement-and-motivation-spon-eidesign/

over" consequence. This approach encourages them to return to the game with new strategies and different approaches with the objective of learning from failure.

4. **Feedback, Not Results**

There's no better way to foster learners' motivation than by promoting, encouraging and guiding them continuously and instantly throughout their game-based learning experience. Unlike end-of-game "win or lose" feedback, instant feedback enables learners to self-check and take remedial action while in the game.

5. **Team Gaming, Not Individual Sports**

Where possible, include team games as part of your game-based learning strategy to foster competition and promote collaboration.

3.2. Positive and negative aspects in the Game-based learning methodology

Top benefits of game-based learning[15]

1. **Helps problem-solving** — Game-based learning can help students solve problems by fostering skills like understanding causation, logic and decision-making they can use in life outside of school.
2. **Encourages critical thinking** — Research has shown that GBL can improve students' critical thinking skills, "including the development of independent beliefs prior to engaging in collaborative discourse and providing opportunities for guided reflection."
3. **Increases student engagement and motivation** — A 2019 research paper found when teachers incorporated digital game-based learning elements such as feedback, choice and collaboration into their instructional design, students become more engaged and motivated to learn.
4. **Introduces situational learning** — Learning doesn't only occur in our heads; it, in fact, it's a fundamentally social process. Proposed in 1991 by Jean Lave, anthropologist, and

[15] https://www.prodigygame.com/main-en/blog/game-based-learning/

Etienne Wenger, a computer scientist, situated learning helps students understand new concepts in the context of their social relationships.

5. **Addresses special education needs** — GBL positively impacts special education classrooms, too. Researchers found that for students with individualized education plans, "game-based learning is a must to help guide instruction, create a positive environment, and generate academic success… [And students] with autism [are] more successful and motivated when using computerized games for academic lessons."

Potential drawbacks of game-based learning

Depending on your personal teaching approaches or a student's individual learning style, there can be drawbacks to game-based learning:

- Too much screen time
- Games aren't always created equally
- Games can be a source of distraction
- It requires a technology learning curve
- Doesn't replace traditional learning strategies
- Not always aligned to teaching or learning goals

Researchers still have much to study about GBL and, if not implemented effectively, teachers and students can have a poor experience.[16]

3.3. EU dimension on Game-Based learning application

In recent years the European Union has invested in research on innovative approaches to education, including game-based learning and gamification. Europe's openness to new learning strategies is encouraging. Their many successful game-based learning efforts serve as a model for games playing a critical role in improving education.[17]

[16] https://www.prodigygame.com/main-en/blog/game-based-learning/
[17] https://triseum.com/2018/03/18/the-game-based-learning-revolution-in-europe-a-look-at-four-key-initiatives/

Here are four key initiatives around the European Union:

European Conference on Game-Based Learning

The European Conference on Games Based Learning (ECGBL) offers an opportunity for scholars and practitioners interested in the issues related to Games Based Learning to share their thinking and research findings. The conference examines the question "Can Games-Based Learning Enhance Learning?" and seeks high-quality papers that address this question.

By fostering a vibrant exchange of ideas between people interested in new approaches to education throughout the continent and around the world, the conference plays a key role in pushing game-based learning into the mainstream and highlights key research on educational games.

European SchoolNet

European SchoolNet comprises education ministries from 34 countries that have joined forces to research and advance innovative teaching methods. Founded in 1997, the group is focused on leveraging technology to enhance education as well as making sure education across the continent is aligned with the technical skills 21st century employment demands.

Open Education Europa

An initiative of the European Commission, Open Education Europa is aimed at helping educators across Europe share ideas on how to improve education through digital technologies.

One notable initiative, Making Games In Collaboration for Learning (MAGICAL), focused on the learning opportunities educators can unlock by getting students to design their own digital games. A group of researchers developed a platform that student with no coding skills could use to create their own games. Classroom pilots in five countries (Belgium, Italy, Greece, Finland and the U.K.) introduced the concept to students ages eight to twelve, with very encouraging results. Researchers discovered strong evidence the process elicited a high level of engagement from the students and contributed to collaboration skills.

STEM Alliance

The STEM Alliance is an initiative supported by a variety of organizations and businesses that aims to equip young Europeans for careers in science, technology, engineering and

mathematics. To that end, one of its main goals is to develop new ways to get young people engaged and excited about STEM subjects. Naturally, game-based learning is an approach the organization has identified as holding promise in this regard.

In 2017, the STEM Alliance had three schools — in Romania, Italy and Greece — use Triseum's adventure game, Variant: Limits, to teach calculus. The feedback from the participating students and teachers was extraordinarily positive. Students described the game as fun and effective at teaching the subject matter. "The game is really different from the other technologies I have tried out," said one student., "It motivates you to continue playing and discover what else might be coming your way."

4. Session mapping and planning

Session planning

A training session plan – also called a learning plan – is an organized description of the activities and resources you'll use to guide a group toward a specific learning objective.

It details the subject matter that you'll teach, how long each section should take, the methods of instruction for each topic covered, and the measures you'll use to check that people have learned what you needed them to learn.

It can be as simple as a brief outline, or more complex, with scripts, prompts, and lists of questions that you plan to ask.[18]

Concept mapping

A type of learning support that might facilitate learning in a game-based learning environment is concept mapping (Charsky & Ressler, 2011; Kwon & Cifuentes, 2009).

Concept maps are visual representations of information. They can take the form of charts, graphic organizers, tables, flowcharts, Venn Diagrams, timelines, or T-charts. Concept maps are especially useful for students who learn better visually, although they can benefit any type of learner. They are a powerful study strategy because they help you see the big picture: by starting with higher-level concepts, concept maps help you chunk information based on meaningful connections. In other words, knowing the big picture makes details more significant and easier to remember.[19]

Concept maps work very well for classes or content that have visual elements or in times when it is important to see and understand relationships between different things. They can also be used to analyze information and compare and contrast.[20]

[18] https://www.mindtools.com/pages/article/planning-training-session.htm
[19] N.A. Kranenburg. THE EFFECTS OF CONCEPT MAPPING IN GAME-BASED LEARNING. Faculty of Behavioural Science, Educational Science and Technology University of Twente
[20] https://learningcenter.unc.edu/tips-and-tools/using-concept-maps/

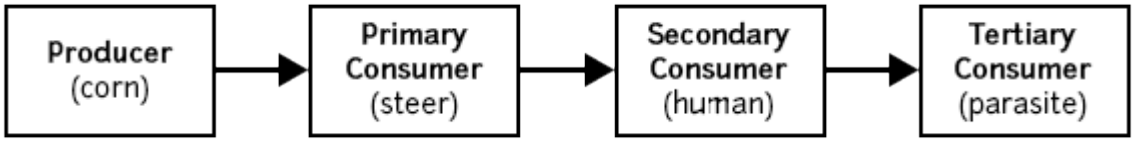
Concept maps are graphical tools for organizing and representing knowledge. They consist of concepts, referring to facts or definitions that are placed within circles or boxes. These concepts are connected with lines, including short words or phrases to represent their relationships. A characteristic of concept maps is the hierarchical layer system. The most important concepts are placed at the top of the map, while specific, less general concepts are hierarchically placed below. Since the structure depends on the content of a specific topic, referencing to a specific learning objective makes it easier and more clearly to structure the considered knowledge and prevents learners to deviate from the learning goal.[21]

Concept maps are considered as an effective visualized learning tool that supports learners identifying concepts, topics, ideas, and their relationships, making sure learners actively reflect on their own interpretation and construct meaningful learning.

Several studies have examined the role of concept mapping within game-based learning environments. For example, Coller and Scott (2009) used concept maps as an evaluation instrument for a game-based course. They found that concept mapping has the potential for improving students' learning performance. Kwon and Cifuentes (2009) explored the differences in effectiveness of collectively and individually constructed concept maps through game play, resulting in equally positive effects on science concept learning with higher quality concept maps in the collaborative condition.[22]

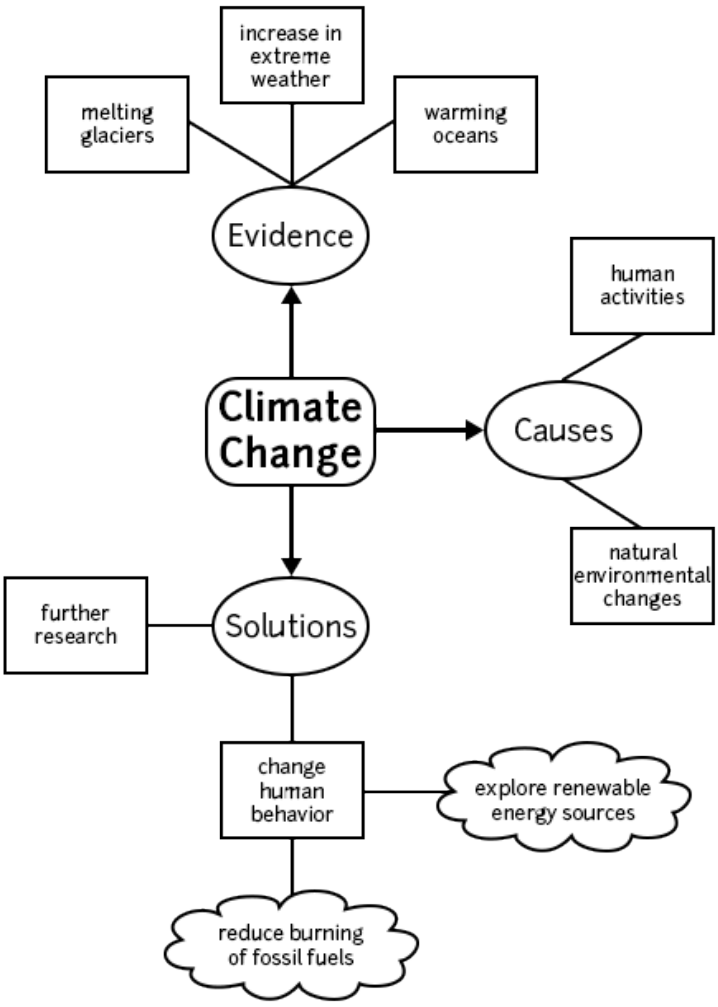
Here are a few examples of concept maps that can be useful for Game-Based learning:

1. This example illustrates the relationship between ideas that are part of a process, such as a Food Chain.



[21] N.A. Kranenburg. THE EFFECTS OF CONCEPT MAPPING IN GAME-BASED LEARNING. Faculty of Behavioural Science, Educational Science and Technology University of Twente
[22] N.A. Kranenburg. THE EFFECTS OF CONCEPT MAPPING IN GAME-BASED LEARNING. Faculty of Behavioural Science, Educational Science and Technology University of Twente

2. This example illustrates the relationship between a main idea, such as climate change, and supporting details.



4.1. Game-based Learning Tools

- **Duolingo** – gamifying language learning by having students complete drill-and-kill grammar and vocabulary exercises while receiving experience points to gain levels and access more difficult exercises
- **Minecraft** – a vernacular game that has been adapted for learning environments by giving students a sandbox to build and construct their own virtual worlds

- **Coursera** – a platform that provides free educational courses for anyone who is interested, but to promote interactivity and retention, badges and other reward systems are implemented for participants
- **Brainscape** – improved flashcards that promote retention of knowledge using what they call "confidence-based repetition", designed to be more appealing and fun to use to also assist in retention
- **Kahoot** – a classroom response system that is free to use and doesn't require student sign-up; simply create a game of Kahoot, enter in questions, and supply the provided pin to your students, who will then use their phones or laptops to play the game and answer questions
- **TopHat** – a classroom response system, like Kahoot, that allows students to provide responses to questions in the class anonymously; unlike Kahoot, this has a fee.

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