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Git Game – Learning by Playing

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Abstract in German

Diese wissenschaftliche Arbeit geht der Frage nach, ob Nutzer durch Lernspiele im Vergleich zu Videos, Texten oder anderen Methoden schneller lernen. Es wurde eine Literaturrecherche durchgeführt, um Informationen über frühere Forschungen zu diesem Thema zu sammeln, einschließlich Studien, die die Wirksamkeit verschiedener Arten von Lernmaterialien und -methoden untersucht haben, sowie relevante Theorien oder Modelle in Bezug auf Lernen und Gedächtnis.

Abstract in English

This scientific paper examines the question of whether users learn faster through educational games compared to videos, texts, or other methods. A literature review was conducted to gather information about previous research on the topic, including studies that have investigated the effectiveness of different types of learning materials and methods, as well as any relevant theories or models related to learning and memory.

Acknowledgement

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Table of Contents

[1 Introduction 5](#_Toc126003670)

[2 Theoretical Basics 6](#_Toc126003671)

[2.1 GIT 6](#_Toc126003672)

[2.2 Educational Games 7](#_Toc126003673)

[2.2.1 Difference between serious games 7](#_Toc126003674)

[3 Case Studies 8](#_Toc126003675)

[3.1 Case-Study 1 8](#_Toc126003676)

[3.2 Case-Study 2 8](#_Toc126003677)

[4 Conclusio 8](#_Toc126003678)

[Literaturverzeichnis 9](#_Toc126003679)

# Introduction

The impact of the internet and technology on our lives has made it clear that traditional ways of learning are no longer enough. People are looking for new methods of learning that push them to think and learn differently, and learning games are a great way to do this. They can be used to motivate different types of learners and change the way they think and act.

Current educational trends focus on developing the skills of learners rather than just increasing their knowledge. This approach emphasizes the role of teachers and educators as guides rather than traditional instructors.

Computer games have been a popular form of entertainment for many years, and in recent times, they have become even more prevalent in social interactions through social media. A diverse group of people, including those of different ages, genders and professions, have taken up gaming. With the increasing amount of time spent online and on computing devices, it is logical to utilize some of that time for educational purposes, as many people play games regularly.

Games can be very powerful tools for learning as they allow players to see the consequences of their choices and improve problem-solving skills. Learning games help learners understand the broader context and can also enhance creativity. Additionally, these games offer the opportunity to try things that are not possible in real life, making them particularly useful for exploring expensive or dangerous subjects.

Another benefit of learning games is their ability to elicit emotions, which can enhance the learning experience. For example, escapism is a common motivation for gaming, which can also be used in an educational context. Positive emotions such as fun, enjoyment, and pleasure can keep players engaged in the game, while a balance of challenge and difficulty can maintain their interest. Carefully crafted rules, goals, characters, and a compelling story can inspire passion, and competition can provide a sense of excitement. By tapping into these emotions, the effectiveness of learning can be improved.

The concepts of playfulness and gamification are becoming increasingly popular in workplaces. They can be applied in everyday situations by incorporating elements similar to games, such as scoring workers' outcomes. For example, a worker could be awarded points for completing a design document or assisting a colleague. This approach is used to give clear feedback, guide action towards achieving goals and motivate workers to improve their performance.

While learning games offer many benefits, there are also challenges to consider. Different age groups have different levels of ability and interest in using technology, so a learning game should be easy to understand for beginners yet challenging enough for experts. This applies not only to computer use but also to mobile devices and tablet computers.

Another challenge is the user's skill level, which presents both technical and content-related difficulties. Game developers must be careful not to create games that are too simplistic, as they may demotivate players. To prevent boredom, learning games should be diverse and include well-designed content and an appropriate level of technical challenges to keep learners engaged. [1]

# Theoretical Basics

This section introduces the most important theories that are relevant for understanding the topic.

## GIT

Git is a version control system that enables you to keep track of all the modifications made to files over time. It allows you to monitor all files related to a project, including text and code files, with great ease.

One of the most valuable features of Git is its ability to maintain multiple versions of a single file. This allows you to revert to a previous version if necessary, ensuring that you never lose work or accidentally break the code for your application.

For example, if you have developed an app with some features and it is working well, and you introduce a new feature but mistakenly make changes to the code files that cause the app to crash, and you can't identify the problem. Additionally, you might have added a feature, but later decide it's not needed and want to remove it. With Git, you can easily revert to a previous version of the code before the feature was added or errors were made, allowing you to troubleshoot or remove the feature without affecting the rest of the application.

Without a version control system like Git, resolving these issues would require manually identifying and undoing the changes made, which is prone to errors and takes a lot of time. With Git, you can simply revert to a previous version of the code, making it easy to identify and fix the problem or remove the unnecessary feature quickly and with confidence that you have restored the correct version of the code.

Git allows you to quickly and easily revert the entire code of an app to a previous state with a few simple commands. Additionally, having a version control system like Git gives you the freedom to experiment with your code without worrying about breaking the functionality of your application. You can easily roll back any changes that don't work out. [3]

## Educational Games

Educational games are interactive and engaging learning experiences that use game mechanics, technology, and design to teach and reinforce concepts and skills. They can be used to teach a wide range of subjects, from math and science to history and language arts. [4]

Educational games can help students to improve their maths and reading skills and have also been used to train professionals in a variety of fields, including healthcare, military, and business. [5]

### Difference between serious games

In educational games, the aim is to learn and achieve new levels by playing.

Serious games tend to have a whole story, missions to complete and they are mostly developed for people who want to have fun in their free time. [6]

# Case Studies

After understanding the main concept and the theoretical basics of educational games in connection with GIT, the focus in this section will be on research studies.

## Case-Study 1

In the book "The Game Believes in You: How Digital Play Can Make Our Kids Smarter" by Greg Toppo, the author discusses how educational games can help students improve their math and reading skills. He cites a study in which middle-school students who played a math game called "DragonBox Algebra" performed significantly better on standardized math tests than a control group who did not play the game. [4]

## Case-Study 2

"Serious Games: Games That Educate, Train, and Inform" by Clark Aldrich provides a detailed look at how educational games have been used to train professionals in a variety of fields. In the book, Aldrich describes a case study of a simulation game called "Virtual U" that was used to train medical students. The game simulates a virtual hospital and allows students to practice diagnostic and treatment skills in a safe, controlled environment. The study found that students who played the game performed significantly better on a standardized test of diagnostic skills compared to a control group who received traditional classroom instruction.

Additionally, the book also provides an example of how the military used a game called "Full Spectrum Warrior" to train soldiers in the tactics and decision-making necessary for urban warfare. The game was found to be more effective in preparing soldiers for real-world combat situations than traditional training methods. [5]

# Conclusio

In conclusion, educational games have been proven to be a valuable tool in enhancing learning outcomes and training professionals in various fields. They provide interactive and adaptive feedback, promotes active learning and engagement, which leads to better retention of information. Studies and books provide ample evidence for the effectiveness of educational games.

Literaturverzeichnis

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| --- | --- |
| 1. [1] | 1. S. Puhjo, „Elomatic,“ [Online]. Available: https://www.elomatic.com/en/elomatic/expert-articles/using-games-to-enhance-learning.html. |
| 1. [2] | 1. V. Singh Khatri, „Hackr.io,“ 15 December 2022. [Online]. Available: https://hackr.io/blog/how-to-learn-git. |
| 1. [3] | 1. D. de Oliveira, „Cprime,“ [Online]. Available: https://www.cprime.com/resources/blog/the-7-best-git-tutorials-to-get-you-started-quickly/. |
| 1. [4] | 1. G. Toppo, The Game Believes in You: How Digital Play Can Make Our Kids Smarter, St. Martin's Press, 2015. |
| 1. [5] | 1. C. Aldrich, Serious Games: Games That Educate, Train, and Inform, 2006. |
| 1. [6] | 1. J. Glover, „Quora,“ 2017. [Online]. Available: https://www.quora.com/What-is-the-difference-between-educational-games-and-serious-games. |