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JOYFUL LEARNING WITH APP-BASED INTERACTIVE QUIZZES IN SENIOR HIGH SCHOOLS IN THE DIGITAL ERA

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Abstrak

Penelitian ini bertujuan untuk mengidentifikasi penggunaan kuis interaktif berbasis aplikasi dalam joyful learning. Studi ini menggunakan pendekatan systematic literature review (SLR). Sumber rujukan berasal dari artikel jurnal, buku yang relevan dengan pembahasan yang didapatkan dari portal atau website resmi pengindeks jurnal. Setelah mendapatkan artikel, langkah selanjutnya adalah melakukan tabulasi berdasar pokok pembahasan dalam penulisan yang telah disusun. Teknik analisis data dalam penelitian ini menggunakan analisis konten. Hasil penelitian ini menunjukkan bahwa joyful learning sangat urgen untuk diterapkan dalam pembelajaran, guna menghasilkan pembelajaran yang optimal, partisipatif, kreatif dan menyenangkan. Joyful learning menjadi jawaban atas berbagai problem pembelajaran. Penggunaan platform aplikasi untuk kuis interaktif dapat diintegrasikan dalam joyful learning. Ada beberapa aplikasi yang mendukung, diantaranya adalah kahoot!, quizizz dan wordwall. Ketiga aplikasi tersebut dapat digunakan dalam pembelajaran utamanya untuk kuis interaktif, guna melihat perkembangan dan evaluasi belajar siswa, melatih daya kritis dan memberi pengalaman belajar siswa yang lebih bermakna. Aplikasi tersebut juga memiliki fitur yang beragam dan menarik sehingga dapat diatur menjadi lebih friendly dan tentunya relevan dengan era digital seperti saat ini.

Kata kunci: *Era Digital; Joyful Learning; Kuis Interaktif Berbasis Aplikasi*

Abstract

This study aims to identify the use of app-based interactive quizzes in joyful learning. This study uses a systematic literature review (SLR) approach. Reference sources came from journal articles and books relevant to the discussion obtained from portals or official journal indexing websites. After obtaining the articles, the next step is to tabulate them based on the main discussion in the writing that has been compiled. The data analysis technique in this research uses content analysis. The results of this study show that joyful learning is urgent to be applied in learning, in order to produce optimal, participatory, creative and fun learning. Joyful learning is the answer to various learning problems. The use of application platforms for interactive quizzes can be integrated in joyful learning. There are several applications that support this, including kahoot!, quizizz and wordwall. These three applications can be used in learning, especially for interactive quizzes, to see students' learning progress and evaluation, train critical thinking and provide a more meaningful learning experience for students. These applications also have diverse and interesting features so that they can be organized to be more friendly and certainly relevant to the digital era as it is today.

Keywords: *App-based Interactive Quizzes; Digital Era; Joyful Learning*

INTRODUCTION

One of the main problems in learning today is the decline in student motivation. Monotonous and uninteresting learning can cause students to lose interest in learning. Joyful learning, which emphasizes the use of fun, interactive and entertaining learning methods, can provide the necessary motivational boost. When students feel happy and engaged in learning, they are more likely to actively participate and try harder (Kruk et al., 2022). Joyful learning can be an effective solution to solve this problem. Digital learning apps and platforms that offer interactive and fun learning can help students stay engaged and focused in a virtual learning environment and enable effective teaching without being in a physical classroom (Saleem et al., 2022).

Teachers can also face problems in carrying out effective teaching. Joyful learning provides teachers with tools and approaches that help them create more engaging and meaningful learning experiences (Gupte et al., 2021). It allows teachers to create a more dynamic and inspiring classroom environment. Joyful and interactive learning encourages creativity and innovation. Students are encouraged to think critically, explore new ideas and create innovative solutions. These are very important skills in an ever-changing world (Hirsh-Pasek et al., 2020).

Academic burnout has become a serious problem in education today. Students often feel stressed and exhausted due to the rigorous demands of the curriculum and the pressure to achieve high results. Joyful learning can help reduce these stress levels by creating a more relaxed and positive learning experience. When students enjoy their learning, they are more likely to cope with academic pressure (Basri et al., 2022). Joyful and interactive learning also supports the development of social and emotional skills. Students learn to collaborate in teams, communicate effectively, and manage their emotions well. These are important skills in their daily and future lives. Joyful learning creates memorable learning experiences for students. They are more likely to remember the information and concepts taught when learning is associated with positive experiences. This contributes to the formation of deeper understanding and better retention (Parker & Thomsen, 2019).

The use of digital technology in joyful learning can help students and teachers better deal with technological challenges. They can become more skilled in using digital devices and online learning platforms, which are increasingly important skills in an increasingly connected society. In the rapidly changing world of education, the application of joyful learning is a relevant and important step to overcome various learning problems today (Kim et al., 2022). It provides solutions to increase student motivation, support distance learning, and improve teaching quality. In addition, joyful learning promotes creativity, innovation, and the development of social and emotional skills that are important for students'

development. By implementing a joyful learning approach, education can become more empowering and memorable for all participants (Hunter-Doniger, 2021).

The application of app-based interactive quizzes has a strong relevance in the application of joyful learning. Joyful learning aims to create a positive, engaging and dynamic learning experience for students (Areed et al., 2021). The use of app-based interactive quizzes is one of the effective ways to achieve learning objectives as planned. Interactive quiz apps are designed to be interactive, entertaining and engaging. They often use game elements, colors, sounds, and stimulating challenges. This makes learning more fun and triggers excitement in the learning process (Liao, 2022).

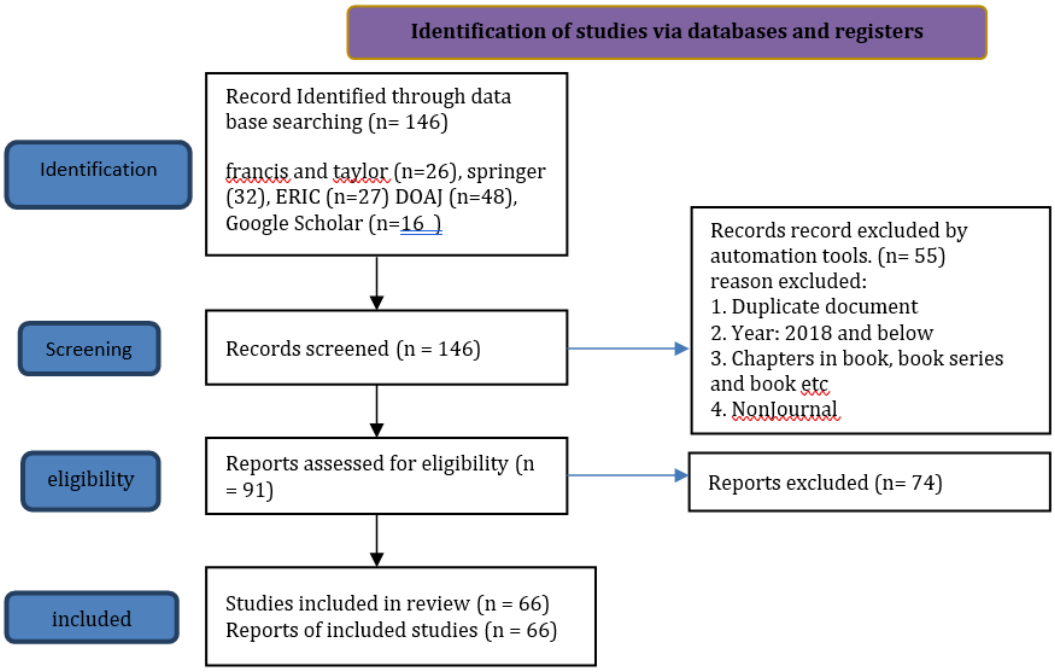
Interactive learning is one of the key elements of joyful learning. Interactive quiz apps give students the opportunity to be actively involved in the learning process. They are not only listening, but also participating in the learning in a more direct way. Interactive quiz apps allow students to use technology productively (Campillo-Ferrer et al., 2020). Students will learn how to use digital devices for educational purposes, which is a valuable skill in an increasingly digitized world. App-based interactive quizzes help teachers to measure student understanding quickly and accurately. The quiz results provide guidance on the extent to which students understand the learning material. This allows teachers to customize their teaching according to students' needs (Akour & Alenezi, 2022).

The purpose of this research is to identify the importance of implementing joyful learning to produce fun and meaningful learning through digital applications in the form of interactive quizzes as supporting tools. Research with the same theme has actually been done before. As conducted by Horts, with his research title "joyful learning through stories" (Horst et al., 2019). In addition, there is also research from Widyawulandari entitled "implementation of a joyful learning approach in providing learning motivation for elementary school students" (Widyawulandari & Indriayu, 2019). Another research was also conducted by Bhakti with the research title "joyful learning: an alternative learning model to increase student happiness" (Bhakti et al., 2019). Some of these previous studies have not touched on the aspect of joyful learning with application-based interactive quizzes. Thus, this distinction is a differentiator of this research from previous research.

METHODS

This research uses a systematic literature review (SLR) approach which is included in library research (Linnenluecke et al., 2020). Data collection techniques used documentation through searching for journals, books, or proceedings relevant to the theme of joyful learning and application-based interactive quizzes. The search for these sources was carried out on existing portals or official websites, through the keywords written down (Xiao & Watson, 2019). The next

process is to tabulate the matrix in accordance with the writing outline that has been made. The data analysis technique uses content analysis. The data that has been collected is then analysed by using cross data that exists in other related sources (Kleinheksel et al., 2020). From the results of the data search above, it can also be identified and filtered using PRISMA 2020. The following are the results of article identification that researchers conducted to detect articles related to the theme "joyful learning and app-based interactive quizzes".



Picture 1. Articles identification

FINDINGS AND DISCUSSION

Joyful Learning: Its Urgency and Positive Impact on Education

Education is one of the key aspects in the development of individuals and society. However, learning is often perceived as a tedious and exhausting task. This is why the importance of "joyful learning" is becoming increasingly recognized in education (Waterworth, 2020). Joyful learning is a learning approach that emphasizes excitement, enthusiasm and desire to learn. Joyful learning will greatly impact students, teachers and the education system as a whole (Horst et al., 2019).

One of the main reasons why joyful learning is so important is that it can increase students' motivation. When students feel happy and enthusiastic about learning, they are more likely to actively participate in the learning process. This high motivation can spur them to seek further knowledge and deepen their understanding of the subject matter. In addition, students who feel happy in learning tend to have higher retention rates as they are more likely to remember the information delivered well (Rachmavita, 2020).

Joyful learning can create a more positive and inclusive classroom environment. When students feel happy and comfortable in the classroom, they are more likely to collaborate with classmates, share ideas and help each other. This can reduce the level of unhealthy competition and create an atmosphere where every student feels valued and supported in their journey in learning (Calp, 2020). The positive impact of joyful learning can also be felt by teachers. Teachers who implement this approach feel more engaged and excited about teaching. They feel fulfilled when they see their students grow and develop in a joyful environment. In addition, joyful learning can help address the issue of teacher burnout, as teaching in a fun and meaningful way can reduce the stress and fatigue often experienced by educators (Calderón et al., 2020).

Besides student motivation and engagement, joyful learning also has other positive impacts, such as increased creativity and problem solving. When students are happy in their learning, they are more likely to think creatively, come up with new ideas, and seek innovative solutions to the problems they face (Galatsopoulou et al., 2022). These are very important skills in an ever-changing and evolving world, where the ability to think creatively and solve problems is highly valued. The joyful learning approach can also improve students' social skills. When students feel happy in learning, they are more likely to interact with their classmates and teachers. This can help them develop healthy communication, cooperation and conflict resolution skills. These social skills will be very useful in their daily lives and in the future as they interact with people from different backgrounds (Voukelatou, 2019).

Learning approaches should be open and accommodate the different characters of students in the classroom. The joyful learning approach can be one of the options. On a larger scale, joyful learning can also change the education system as a whole. This approach can encourage changes in curriculum and teaching methods that are more interesting and relevant to students. It can also trigger innovations in the evaluation and measurement of student achievement, focusing not only on tests and grades, but also on deep understanding and real-life application of knowledge (Toropova et al., 2021).

Implementing joyful learning is not an easy task, as there are several stages to go through. It requires support from all stakeholders in education, including teachers, students, parents and education authorities. In addition, it takes time and effort to change the existing learning culture and integrate the joyful learning approach into the existing education system. In general, joyful learning is a very important learning approach in today's education world. It not only increases student motivation and engagement, but also creates a positive classroom environment, supports teacher development, and helps students develop skills that are indispensable in real life. Therefore, stakeholders in education should work together to encourage and implement joyful learning in the learning process

so that education can be a meaningful and enjoyable experience for all students (Zeng et al., 2020).

Joyful learning is an educational approach that focuses on the happiness and joy of students during the learning process. It is an important dimension in improving the quality of education as it links positive learning experiences with better outcomes. One of the main dimensions of joyful learning is to trigger students' intrinsic motivation. When students feel joy in learning, they don't just learn because they have to, but because they are curious and want to improve (Widyawulandari & Indriayu, 2019). This motivation gives them the drive to explore topics more deeply and seek deeper understanding. This approach also focuses on creating positive emotional experiences during learning. This includes creating a classroom environment that is welcoming, encourages exploration and stimulates curiosity. Students who feel comfortable and happy in the classroom tend to participate more and be more open to learning. Joyful learning can stimulate students' creativity and give them the freedom to think creatively, come up with new ideas, and explore innovative solutions to problems. Creativity is an essential skill needed in an ever-changing and evolving world.

The joyful learning dimension also includes aspects of collaborative learning. Students are invited to work together with classmates, share knowledge and learn from each other. This creates a learning community that supports and encourages mutual growth. In joyful learning, students are not just passive recipients of information, but they engage in active learning experiences (Herrera-Pavo, 2021). They conduct experiments, creative projects, and discussions that allow them to take an active role in the learning process. One of the other important dimensions of joyful learning is linking knowledge to real-world contexts. This helps students see the relevance of what they are learning in their daily lives, which increases their motivation and interest in learning (Bhakti et al., 2019).

This approach can also be used as a tool to explore students' personal interests in the context of learning which can allow students to choose project topics or tasks that they are interested in, which can increase their engagement. Joyful learning can actually be used as a positive reinforcement for students' learning development. Students are rewarded for their efforts, and this can boost their confidence and passion for learning (Walkington & Bernacki, 2020). This approach will also create a balance between structure in teaching and freedom in learning. Students have the necessary guidance, but also have the flexibility to explore topics in the way they choose. Concretely, joyful learning is an important dimension in education because it creates a positive learning environment, motivates students, and helps them develop the skills needed for success in the real world. It also encourages innovation in teaching and puts the student experience at the center of attention. Through the implementation of joyful

learning, we can create an education system that is more relevant and meaningful for all students (Keung & Cheung, 2019).

The integration of joyful learning with other learning methods and approaches can create a more diverse, engaging and effective learning experience. An educator can utilize various approaches to meet the needs of diverse students. In joyful learning, collaborative learning principles should be applied. Students can work together on creative projects that allow them to experience the joy of collaborating with classmates, while still focusing on the learning objectives (Hartt et al., 2020).

A project-based learning approach can also be implemented to generate lively learning by integrating joyful learning so as to motivate students in carrying out their projects. Students can have fun in exploring and creating innovative solutions in the context of their projects. Joyful learning can also be integrated with differentiated learning which allows teachers to create an enjoyable and relevant experience for each student. Teachers can accommodate students' interests, learning styles and ability levels in a variety of ways that can encourage joy in learning. The success of this approach is largely determined by the activeness of students as the object of learning. Good learning is student-centered, such as flipped classroom or cooperative learning, joyful learning can enrich students' experience by bringing an element of fun in learning activities. This could involve games, challenges or creative activities that trigger excitement (Jääskä & Aaltonen, 2022).

The problem-based approach can also be designed as part of joyful learning, which is implemented by designing scenarios or problems that are interesting and relevant to students. Of course, this will motivate them to find solutions as well as enjoy the problem-solving process. Joyful learning can be applied by creating interesting experiments, practical activities, or projects that allow students to experience the joy of scientific and technological exploration. Integration of learning with technology is mandatory, in order to accommodate the current generation who are familiar with the digital world in their daily lives (Smith et al., 2020).

Art can also be tried to be applied in order to build a fun classroom atmosphere. Students can create emotionally evocative artworks, collaborate on art projects and feel joyful in their creative expression. Game-based learning can be integrated with joyful learning by designing games that support joyful learning while still meeting the learning objectives (Sundaram & Ramesh, 2022). Joyful learning does not always have to conflict with traditional instructional approaches. Teachers can create an element of joy in teaching by using interesting stories, illustrations or examples to explain difficult concepts. The integration of joyful learning with other learning methods and approaches allows education to be more flexible and relevant. It creates room for excitement and motivation in learning,

but still meets students' academic and skill development goals. With this diverse approach, education can become more interesting and meaningful for all students (Hirsh-Pasek et al., 2020).

The first step in implementing joyful learning is to understand students individually and as a group. Teachers should understand students' interests, learning styles, ability levels and special needs. This will help in designing learning experiences that suit them. After understanding the students, teachers can design an interesting and relevant curriculum. This could include selecting topics that appeal to students or creating learning scenarios that spark their curiosity. Another important step is to use creative learning methods that include elements of joyful learning. This could include collaborative learning, project-based learning, educational games or practical experiments (Jeet & Pant, 2023).

A positive and comfortable classroom environment is key to joyful learning. Teachers should create an atmosphere where students feel safe to express ideas, share their views and actively participate in learning. Technology can be a very useful tool in joyful learning. Teachers can use apps, software or online learning platforms to create interactive and engaging learning experiences. Students need to have space to explore their personal interests. Teachers can provide elective projects or time outside of class to allow students to pursue topics they love (Calp, 2020).

Teachers should collaborate with students in lesson planning and implementation to create an atmosphere of students' sense of ownership of their own learning. After implementing joyful learning, teachers need to do continuous reflection and improvement. They can identify what works and what needs to be improved to make the learning experience even better. Implementing joyful learning is an ongoing process and requires a commitment to creating valuable learning experiences for students. By following these steps, educators can help students feel happy, engaged and motivated to learn, which in turn will improve their learning outcomes (Amiruddin et al., 2021).

App-based Interactive Quizzes in the Digital Age

Interactive quizzes can be applied in joyful learning as one of the media to increase student participation while livening up the classroom atmosphere and lifting student motivation. Nowadays, quizzes are available in digital services in the form of website applications that can be accessed by anyone. Through this convenience, a teacher can apply app-based interactive quizzes to improve the quality of their learning in a fun way. Quizzes can be used as a practical evaluation tool to measure students' understanding and knowledge. There are several applications that can be used to implement joyful learning with app-based interactive quizzes, including:

The Kahoot!

The Kahoot! app has been one of the highly effective tools in improving learning success at various levels of education. With its interactive approach and engaging learning games, Kahoot! has helped teachers and students better achieve learning objectives. One of the key benefits of Kahoot! is its ability to increase student participation. With its interactive nature and fun games, students are more likely to engage in the learning process. They feel motivated to actively participate in quizzes and strive to achieve the highest score. This is an important step in creating an active and dynamic classroom environment (Guardia et al., 2019).

The application of this app in learning will be more optimal if it uses an active learning approach and involves students directly in problem solving and critical thinking. Interactive quizzes and quick questions trigger students' quick thinking. As a result, students are more likely to understand and remember the subject matter better. They associate the information with positive classroom experiences. The app can also serve as an effective tool to measure student understanding in a quick and formative manner. Teachers can quickly identify areas that require additional understanding and address those issues immediately. This allows for more targeted teaching and personalization of learning (Licorish et al., 2018).

Learning outputs will be more visible when teachers can apply appropriate learning methods and approaches. The ultimate goal of learning itself is the achievement of indicators that have been determined in the lesson plan that has been prepared. App-based learning can be an adaptive and relevant learning approach for students. In addition to improving material understanding, Kahoot! also supports the development of social skills and the ability to work in teams. The team game model allows students to collaborate, discuss and make decisions together. These are important skills needed in the real world (Tóth et al., 2019).

Kahoot! can be used in a variety of educational contexts, whether in classical teaching, distance learning, or as an additional tool to reinforce material. It gives teachers the flexibility to integrate technology in their teaching according to the needs and situation. The app also encourages the development of students' creativity. Teachers can let students create their own quizzes, which engages them in critical thinking and designing effective questions. This allows students to become producers of educational content, not just consumers (Wang & Tahir, 2020).

Teachers can also independently design and create their own quizzes to make them interesting and relevant to students' conditions. In addition to creating their own quizzes, teachers can utilize existing quizzes across different subjects and levels. This gives them access to diverse learning resources and allows them to customize their teaching according to their curriculum. However, it is important to remember that the effectiveness of Kahoot! depends on how it is used. Overusing it

or in irrelevant contexts can obscure its positive effects. It is also important for teachers to assess student learning outcomes more holistically rather than just focusing on scores in these digital quizzes (Zarzycka-Piskorz, 2016).

It is important to note that the use of Kahoot! should be in line with the learning objectives. It should not be a substitute for in-depth teaching and strong concept understanding (Yong & Rudolph, 2022). Rather, it is a tool that can be used to enhance the learning experience and measure student understanding. Overall, Kahoot! has proven itself to be an effective tool in enhancing learning success. It creates a fun learning experience, increases student participation, and helps students understand and recall subject matter. In the ever-evolving era of digital education, Kahoot! is a successful example of how technology can be used to enhance the learning process (Kohnke & Moorhouse, 2022).

Quizizz App

The Quizizz application can be used as a tool of choice for the implementation of interactive and quiz-shaped learning (Rahmah et al., 2019). This application has become popular in the world of education because of its various features that support fun and efficient learning. One of the advantages of Quizizz is its ease of use (Zhao, 2019). Teachers can quickly create quizzes with multiple choice questions, quick answers, or polls with minimal effort. Students can also access quizzes easily through various devices, including computers, tablets, and smartphones. Naturally, this ease makes it more flexible and accessible from anywhere (Chaiyo & Nokham, 2017).

Quizizz offers high interactive elements and entertaining learning games. This makes students more engaged in the learning process. With various features such as matches and point awards, students feel motivated to actively participate in quizzes and compete with each other (Munuyandi et al., 2021). This creates a competitive learning environment and dynamizes the classroom. Apart from classroom use, Quizizz can also be used for self-paced learning. Teachers can share quiz links or access codes with students outside of class hours. This allows students to check their own understanding and prepare for exams or other assignments. It is also useful in distance education (Göksün & Gürsoy, 2019).

Another powerful feature is that it allows teachers to adapt the quiz according to students' needs. They can set the time required to answer each question, show the correct answer after each question, and provide immediate feedback (Lim & Yunus, 2021). This helps students learn at their own pace and improve their understanding. The app gives teachers the flexibility to create their own quiz questions. Teachers can easily customize the quiz by adding images, videos, or links. Of course, this will create a more engaging and relevant learning experience (Anak Yunus & Hua, 2021).

The app can also provide useful data and analysis for teachers. They can see students' scores, the time taken to answer each question, and which questions may

require additional understanding. This allows teachers to assess student learning outcomes and identify areas for improvement (Janković et al., 2023). By using quizzes regularly, teachers can measure student understanding in a measurable and formative way. Through it, it allows teachers to identify comprehension issues quickly and take necessary corrective action. As a result, learning can become more efficient. In addition to existing quizzes, Quizizz provides a variety of quizzes developed by other teachers around the world. Teachers can access to a wide array of learning content that can be used to enrich their teaching. This content covers a wide range of subjects and levels (Degirmenci, 2021).

The effectiveness of Quizizz depends on how it is used. This application will be effective in learning if used in accordance with the conditions and situation at school. Today's students are millennials who are familiar with technology. They are side by side with technology every day (Huei et al., 2021) . The millennial generation's dependence on the digital world must be addressed by educational institutions with the implementation of effective digital learning. A teacher must equip himself with digital skills, in order to be able to escort his students in learning. The integration of learning with digital quiz applications is intended to provide students with a more complex and holistic learning experience (Handoko et al., 2021).

Wordwall App

Wordwall app is one of the digital education tools that has gained recognition and popularity in the education world. Wordwall is designed to help teachers create various types of interactive learning activities, ranging from quizzes, word boards, memory games, to various other types of activities. One of the key benefits of Wordwall is its ability to process learning content. Teachers can create different types of activities that include words, pictures, definitions and other learning content. This helps students to be more interactively engaged in the understanding and retention of the subject matter. Teachers can create games and game-based learning activities through this app. For example, teachers can easily create verb games, charades games or memory games. This approach makes learning more fun and can increase students' motivation to actively participate in learning (Aprilia, 2023).

Users of this app can include visual and audio elements in learning activities. Teachers can insert images, audio or video to provide a better understanding of the concepts being taught. This will certainly help various types of learners, including visual and auditory, in understanding and mastering the material. Teachers can customize learning activities according to students' ability levels and needs and provide a more personalized learning experience that allows students to learn at their own pace. Teachers can create more challenging activities for bright students and provide extra help for students who need extra support (Hidayah & Andriani, 2023).

Practically, teachers can use the Wordwall app as a powerful formative assessment tool. Teachers can create quizzes, surveys, or other evaluations to measure students' understanding periodically as part of the process of identifying students' understanding of the material that has been reviewed. One important aspect of Wordwall is its ability to support blended and distance learning. It becomes a very useful tool for teachers to create interactive and fun learning experiences even in an online learning environment (Kholis et al., 2022).

It also allows teachers to share learning activities and content with each other. Collaboration between teachers aims to share effective learning ideas and resources. Ultimately, all teachers involved in the collaboration process can customize and modify the existing activities according to their needs. The interactive and game-based learning activities in Wordwall can increase students' motivation. Students feel involved in the learning process as they can actively participate and get immediate feedback. This gives them an intrinsic drive to learn. Certainly, joyful learning can be applied by utilizing this application in learning (Matt et al., 2022).

On a regular and ongoing basis, teachers can easily track students' progress in understanding and mastering the subject matter. It can be used as a positive value for teachers to adjust teaching and provide additional help to students who need it. Interactive activities created with Wordwall can increase student engagement. They are not just passive recipients of information, but they are actively involved in answering questions, matching words, or running other games. This makes learning more interesting (Qurbaniah & Setiadi, 2022).

The Use Of App-Based Interactive Quizzes In Joyful Learning In The Digital Era

The use of digital interactive quiz apps in the context of joyful learning is a powerful combination to create a dynamic, entertaining and meaningful learning experience for students. Joyful learning aims to spark excitement and motivation in learning, while digital interactive quiz apps provide an effective tool to achieve this goal. Digital interactive quiz apps, such as Kahoot! or Quizizz, have highly interactive and entertaining properties. They present learning materials in an engaging format with games, colors, and music. This motivates students to actively participate in learning. They feel motivated to compete or achieve the highest score, which increases the level of participation and engagement in the class (Rahmasari et al., 2022).

One of the main principles of joyful learning is to create an enjoyable learning experience. Digital interactive quiz apps allow teachers to present learning materials in a fun and engaging way. They can add game elements such as matches, points and rankings, which creates a more relaxed and positive atmosphere in the classroom. Joyful learning encourages students to be innovative in their learning. Digital interactive quiz apps can be used to stimulate creative and

innovative thinking. Teachers can design questions that encourage students to think outside the box, look for innovative solutions, or make creative judgments (Widyaningsih et al., 2023).

Digital interactive quiz apps include an effective tool to measure student understanding in a quick and formative manner. Teachers can create quizzes covering newly taught material and quickly see how well students have understood it. The quiz results can provide immediate feedback, allowing teachers to customize teaching according to students' needs. In addition to being used in classroom teaching, digital interactive quiz apps can also be used for independent learning. Teachers can give students access to online quizzes that they work on outside of class hours. Naturally, it allows students to check their own understanding, track their progress, and prepare for exams or assignments (Yildirim-Erbasli & Bulut, 2023).

The use of digital interactive quiz apps also encourages collaboration and healthy competition within the classroom. Students can work together in teams to answer questions or compete against each other for the highest score. This supports the development of social skills and the ability to work in teams, which are important in student development. The digital interactive quiz app allows teachers to customize learning according to students' ability levels and interests. Teachers can create a variety of quizzes that are relevant to the individual needs of their students or groups, in order to support a differentiated learning approach, where each student gets a learning experience that suits them (Mohanty et al., 2021).

Students' critical thinking skills can also be honed through the practice questions in this interactive quiz. They have to respond quickly to questions and analyze the answer options available. This spurs logical thinking and problem-solving, skills that are crucial in learning. In the age of digital technology, the use of digital interactive quiz apps also allows students to use technology productively. They learn how to use digital devices for educational purposes, which is a valuable skill in an increasingly digitized world (Allmann & Blank, 2021).

Through regular implementation of learning using digital interactive quiz apps, teachers can conduct periodic evaluations of student understanding. The aim is to help teachers assess students' progress during the learning period and identify areas that require further attention. In general, the use of digital interactive quiz apps in the context of joyful learning is a highly effective option for creating interactive, engaging and meaningful learning experiences for students. It supports the goals of joyful learning by enhancing student motivation, increasing participation, and creating a more positive learning experience. With judicious use, this app can be a powerful tool to improve (Al-Hattami, 2020).

The reason for choosing digital apps for joyful learning is that they have a number of advantages that support the concept of fun, interactive and meaningful

learning. Digital apps are often designed to be interactive and entertaining. They use engaging game elements, graphics and sounds to motivate students. This creates a fun and entertaining learning experience. Digital apps can often be customized to the individual needs of students allowing students to learn at their own pace and focus on topics they are interested in. This personalization creates a more positive learning experience (Zosh et al., 2022).

Digital apps can provide instant feedback to students and allow them to see the results of their efforts quickly, which can be a source of motivation. This feedback also helps students to correct mistakes and improve understanding. Digital apps often support collaboration and healthy competition between students. They can work together in teams to complete tasks or compete in learning games. This creates a positive social dynamic in the classroom. Digital apps strongly support self-directed learning. Students can access learning materials independently, plan their own study schedule, and measure their own progress. This increases students' sense of responsibility for their learning (Haleem et al., 2022).

Many digital apps are designed to be easy to use. They have user-friendly interfaces and clear instructions that reduce technical barriers that might get in the way of a positive learning experience. Digital apps allow teachers to create learning content that matches their curriculum and learning objectives. This provides more control over the learning process and allows teachers to adapt teaching according to student needs. Digital apps continue to evolve and develop rapidly which provides opportunities for innovation in learning methods and the development of more effective joyful learning approaches. In the growing series of educational technology innovations, the use of digital apps can be one of the main options in the effort to create joyful learning. They can improve the quality of learning by making it more engaging, varied and focused on positive experiences for students. When used wisely and in accordance with the learning objectives, digital apps can be an effective tool to achieve joyful learning in education (Mohanty et al., 2021).

CONCLUSION AND SUGGESTION

Joyful learning has considerable urgency to be the basis of learning implementation. This approach is able to raise students' motivation, increase participation, as well as provide an interesting learning experience. Learning with this approach will also liven up the classroom atmosphere, and eliminate monotony or boredom for students. Through this approach, each teacher will also be more creative by combining other learning methods and approaches that are integrated with joyful learning. The use of application-based interactive quizzes in joyful learning can be implemented by using several supporting application platforms, such as kahoot!, quizizz, wordwall. These three applications have their

own advantages. The features in these apps can be designed for the application of interactive quizzes that are fun and relevant to joyful learning. The application of application-based learning is also relevant to current conditions, namely the digital era which requires every individual to be skilled in operating the latest variety of technology.

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