IJOMER
(Indonesian Journal of Multidisciplinary Educational Research)
P-ISSN: 2987-7601 E-ISSN: 2987-0968
https://jurnalfaktarbiyah.iainkediri.ac.id/index.php/ijomer
DOI: 10.30762/ijomer.v2i1.2737

Personalized Learning in a Digital Environment

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Abstract

Utilizing advanced learning technologies, such as data analysis and artificial intelligence, teachers can identify student learning patterns, anticipate possible difficulties, and provide specific additional support. For example, by analyzing students' engagement with online learning platforms, teachers can tailor interventions to address individual learning needs, leading to more effective learning outcomes. Moreover, personalized learning in a digital environment goes beyond the delivery of content; it involves fostering 21st century skills such as critical thinking, communication, collaboration, innovation, and problem-solving. Research has shown that integrating technology into project-based learning activities can significantly enhance students' ability to develop these skills. By optimizing the potential of personalized learning approaches in a digital environment, educators can ensure that every student has an equal opportunity to develop the skills necessary to thrive in an ever-changing world.

Keywords: personalized learning; 21st century skills; learning experience; evaluating student progress

Received:	24-03-2024	Revised:	24-05-2024	Accepted:	24-05-2024

INTRODUCTION

Personalized learning in digital environments is an educational innovation that offers learning experiences tailored to individual needs and abilities (Grant & Basye, 2014). By utilizing digital technology, teachers can create a curriculum that is more relevant and interesting for each student (Nuriyah et al., 2023). In this context, learning can be adjusted to each student's level of understanding and interest (Felder & Brent, 2005), so that the learning process becomes more effective and enjoyable. This learning also allows the provision of learning materials tailored to each student's learning style. By utilizing technology, teachers can provide learning materials in various formats (Ottenbreit-Leftwich et al., 2010), such as text, video, audio, interactive, and others, so that each student can choose the way of learning that best suits their preferences. This helps improve understanding and retention of information, as well as strengthening connections between the concepts taught and students' daily lives.

One of the advantages of personalized learning in digital environments is its ability to provide timely and measurable feedback to students (Maier & Klotz, 2022). Through digital learning platforms, students can follow their own progress, see areas where they have strengths and weaknesses, and receive recommendations for improvement. This allows teachers to focus more on providing specific and effective guidance for each student personally (Fuller et al., 2014). Personalized learning in digital environments also allows students to learn independently, according to their individual learning rhythms (Grant & Basye, 2014). With access to a variety of learning resources and materials that can be accessed anytime and anywhere, students can organize their own study time according to their individual preferences and needs. This helps increase student motivation and independence in the learning process.

In today's digital era, personalized learning in digital environments also enables more effective collaboration between students and teachers (Mohd & Shahbodin, 2015). Through digital platforms, students can interact directly with teachers and fellow students, share ideas, discuss material, and involve themselves in joint projects (Bouhnik & Deshen, 2014). This enriches students' learning experiences and supports the development of important social and collaborative skills in an increasingly digitally connected world. However, there are still several problems that occur among students.

In today's digital era, personalized learning in digital environments also enables more effective collaboration between students and teachers (Mohd & Shahbodin, 2015). Through digital platforms, students can interact directly with teachers and fellow students, share ideas, discuss material, and involve themselves in joint projects (Bouhnik & Deshen, 2014). This enriches students' learning experiences and supports the development of important social and collaborative skills in an increasingly digitally connected world. However, there are still several problems that occur among students, such as unequal access to technology, varying levels of digital literacy, and the challenge of maintaining engagement in a virtual environment (McKinley et al., 2021). For example, students in remote areas might struggle with limited internet connectivity, making it difficult for them to participate fully in digital learning activities. Additionally, some students might find it challenging to adapt to new technologies, impacting their ability to collaborate effectively (Namboodiri, 2022). To address these issues, it is essential for educators and policymakers to ensure equitable access to digital resources and provide adequate training and support for both students and teachers. By doing so, we can maximize the benefits of personalized learning and foster a more inclusive and collaborative educational environment.

The problem with personalized learning in digital environments is the inability to accurately monitor and evaluate student progress. In a digital environment, it is difficult for teachers to directly track each student's progress due to the large amount of data and the complexity of the information available. This can cause difficulties in providing timely help or support to students who need it. Additionally, the lack of direct interaction between students and teachers in online learning can also affect the effectiveness of personalized learning due to the need to deliver instruction in a manner that is more responsive and suited to each student's individual needs.

Another problem is the lack of access and gaps in technology and infrastructure among students. Not all students have the same access to technology devices and stable internet connections, which can prevent them from taking full advantage of personalized learning in a digital environment. This can create inequalities in learning opportunities between financially well-off and less-well-off students. Additionally, a lack of sufficient training and understanding of digital technology can also be a barrier for students and teachers to implementing personalized learning approaches effectively.

To address the challenges of digital assessment and ensure equitable access to technology, a holistic and inclusive approach is needed. Firstly, education should align the curriculum with digital technology so that students can learn from various relevant sources and methods. Secondly, teacher training in utilizing digital technology to develop fair and relevant assessments is key. Research by Raja, (2016) highlights the importance of this training in enhancing the quality of digital assessment. Additionally, government investment in technology infrastructure in less developed areas, as suggested by Ramamurti & Doh (2004), and providing affordable internet access for all societal levels are crucial steps. Collaboration between the government, education, and private sectors can provide comprehensive solutions to overcome these challenges and ensure equitable access to technology for all (Gachie, 2020). Thus, all stakeholders involved can experience the positive benefits of personalized learning in a digital environment without unnecessary concerns.

METHOD

Literature research methodology related to personalized learning in digital environments is very important in exploring the latest information and studies related to this topic (Surur et al., 2023). The first step is to determine relevant keywords such as "personalized learning," "digital education," and "adaptive learning technologies." Next, literature research involves collecting various sources of information, such as scientific journals, articles, books, and related papers, from trusted databases like Google Scholar, JSTOR, and PubMed (Pringgar & Sujatmiko, 2020). It's crucial to use a combination of qualitative and quantitative criteria to select sources, ensuring they are peer-reviewed and published within the last five years to maintain relevance.

For example, one might begin by searching for recent studies on the effectiveness of personalized learning platforms in improving student outcomes. After collecting and reviewing the literature, the researcher can identify trends, gaps, and emerging themes in the field. This process not only helps in understanding the current state of research but also guides future studies by highlighting areas that need further investigation.

Conducting thorough literature research allows educators and researchers to stay updated on advancements and challenges in personalized learning (Surur, 2022). It also provides a solid foundation for developing innovative

teaching methods that leverage digital technologies to cater to individual student needs. By systematically analyzing existing studies, we can ensure that our approach to personalized learning is informed by the latest evidence and best practices.

After the sources of information have been collected, the next stage in the library research methodology is to carry out analysis and synthesis of the information found (Musyawir, 2022). The data that has been collected will be analyzed in depth to extract important findings and information related to personalized learning in the digital environment. This includes identifying trends, comparing concepts, and evaluating the reliability of information obtained from various sources.

The results of the analysis and synthesis from the literature research can be used as a basis for developing a conceptual framework or theoretical foundation related to personalized learning in digital environments (Susanti, 2021). This research methodology helps in developing a deeper understanding of the topic and provides a solid foundation for further research in this area. Thus, literature research is an important first step in understanding the complex issues related to personalized learning in today's digital era.

The library research methodology also involves a critical process in evaluating and selecting the most relevant and high-quality information sources related to personalized learning in digital environments (Zed, 2008). Researchers need to ensure that the sources used can support the validity and reliability of the findings produced in the research. This requires researchers to consider critical aspects such as the research methods used in the source, the validity of the data, and the credibility of the author.

The literature research methodology in the context of personalized learning in digital environments also involves the analysis of current trends and developments in this field. Researchers pay attention to the latest issues, innovative ideas, and supporting technologies that are developing rapidly in the world of digital learning (Aksenta et al., 2023). By understanding current developments, researchers can find new inspiration and present more valuable contributions to their research.

The results of this literature research methodology, conducted by Prasetia, (2022), offer valuable insights into the paradigm shift occurring in digital

education and provide new perspectives on more effective ways to implement personalized learning. By synthesizing existing literature, this research can inform the formulation of policy recommendations, practices, and guidelines for the development of personalized learning in digital environments. For instance, a detailed examination of various studies reveals common themes and emerging trends, which can guide educators and policymakers in designing more tailored and impactful learning experiences. Additionally, by identifying gaps in the current literature, this research contributes to the ongoing discourse on personalized learning and stimulates further inquiry into innovative educational practices. Ultimately, leveraging the findings from this literature research can lead to improvements in the quality of learning, the creation of more meaningful learning experiences, and the promotion of innovation in digital education.

FINDINGS AND DISCUSSION

1. Personalized Educational Design in a digital setting

1.1.2000 – 2010

The resulting DiAL-e framework is actually a toolkit designed to help educators make informed decisions about engaging with digital resources (Burden & Atkinson, 2010). This framework consists of a matrix with two axes: one representing different learning spaces and the other representing various learning designs. Learning spaces identified include large spaces like lecture theatres, small spaces like tutorials, virtual spaces such as online platforms, practical spaces like workshops, independent spaces such as libraries, and mobile learning spaces, which utilize handheld and mobile devices. These are environments where students engage with resources through well-thought-out learning designs.

The second axis of the DiAL-e matrix identifies ten distinct, yet interrelated, learning designs (Burden & Atkinson, 2010). These designs are not mutually exclusive; feedback from user testing indicates significant overlap and interaction between them. Each learning design focuses on specific activities aimed at developing particular skills or understanding, which can be adapted to various digital resources and contexts. Practitioners are encouraged to explore these designs further to enhance their educational practices. Detailed explanations of the ten learning designs are available at www.dial-e.net.

In conclusion, the DiAL-e framework provides a comprehensive guide for educators to navigate and utilize digital resources effectively. By understanding and applying the different learning spaces and designs, educators can create engaging and effective learning experiences tailored to their students' needs.

The matrix tool or framework is intended to be an iterative tool that allows users to identify examples with combinations of learning designs and spaces in which those designs can operate (Burden & Atkinson, 2010). In the interactive web-based version of this tool, developed for the JISC Assisted Take Up material website for the News Film Online archive, examples illustrating each learning design are richly illustrated. These can be rated by users in a YouTube type rating interface. In addition, there is an upload facility, allowing practitioners and students to submit their own copies or redirect existing copies (along with appropriate comments), which will eventually accommodate a matrix with more ideas and illustrations.

1.2.2011 – 2020

Every student is unique and learns in different ways. Personalized learning is based on the idea that students:

- Know how he learns best
- Self-directed and self-managed learning
- Design their own learning path
- Have a voice and choice about their learning
- Is a co-designer of the curriculum and learning environment
- Have flexible learning anytime and anywhere
- Have high-quality teachers who are partners in learning
- Use competency-based models to demonstrate mastery
- Motivated and involved in the learning process (Bray & McClaskey, 2013).

With personalized learning, anyone can become a student. The term student means someone in a class taught by a teacher. Students, on the other hand, drive their learning from anywhere and at any time. Technology plays a different role in individualization, differentiation and personalization:

- Individualization. Students have access to a range of technologies to support their own learning.

- Differentiation. Teachers adapt instruction and select technology to support groups of students.
- Personalization. Teachers select technology for each student's educational plan (IEP) (Bray & McClaskey, 2013).

Personalized learning is not the same as adaptive curriculum (Shemshack & Spector, 2020), where technology drives learning based on data using performance algorithms, such as the number of clicks. It's also not just about giving each student his or her own device. Technology is there to support not encourage learning. The focus of personalized learning is not on technology but on student motivation, engagement, and voice. And, according to researchers Eric Toshalis and Michael Nakkula, in their paper "Motivation, Commitment, and Student Voice," if students have a voice in how they learn, they will be motivated to engage in the learning process.

1.3.2021 – present

Learning strategies are individual approaches that students use to complete educational tasks and improve their skills. Strategic learning contributes to the fact that students become more independent participants in the educational process who can also apply certain strategies in future professional activities (Malykhin & Galla, 2016). A personalized learning approach increases student motivation and engagement, which improves academic performance. Personalized learning is a solution for tailoring education to people's needs and their previous experiences (Lee et al., 2018; Miliband, 2006) allowing each person to reach their full potential through personalized learning (Hsieh & Chen, 2016; Lin et al., 2013). In turn, personalized learning strategies have several synonyms, namely personal learning, individual development trajectory, individual learning path.

The term adaptive learning is often used synonymously with the concept of personalized learning. Today, adaptive learning is a system developed (Lu et al., 2014) that allows to take into account a number of individual differences (Scheiter et al., n.d.; Wang & Liao, 2011), such as gender, learning motivation, cognitive type and learning style, to determine the most suitable adaptive learning experience with proper consideration of various individual differences (Afini, N et al., 2019), as well as to eliminate time and geographic barriers.

Individual Learning Pathway (ILP) refers to a personalized approach in education tailored to address the specific needs and goals of each learner throughout the learning process. It acts as a customized portal offering educational content based on students' cognitive knowledge, learning preferences, and aspirations (Bahçeci & Gürol, 2016). This approach recognizes and accommodates individual differences among students, including learning styles and characteristics (Shemshack & Spector, 2020). By implementing ILPs, educators can ensure that students receive tailored instruction and support to maximize their learning potential. For example, ILPs may involve adaptive learning platforms that adjust content and pacing based on students' performance and interests. Research has shown that such personalized approaches lead to increased engagement, motivation, and academic achievement among students (Bahçeci & Gürol, 2016). Thus, integrating ILPs into educational practices holds promise for fostering more effective and meaningful learning experiences for all students."

2. Development of personalized Education in digital settings

2.1. 2000 – 2010

Given the iterative and developmental nature of the DiAL-e Framework itself, a based methodology was advocated to collect data and inform future developments, including the development of an emerging theoretical model (Glaser & Strauss, 1967). Each housing workshop and seminar is videotaped and individual participants are interviewed regularly throughout the resource development process. Twenty individual interviews with participants were recorded in addition to all plenary sessions at workshops and seminars. In addition, each college allowed the research team to record interviews with participants at the end of the project at the university itself. Individual interviews explored the resource development process and the influence of the DiAL-e Framework itself on participants (Salas & Moller, 2015). At the end of the process, interviews also explored the impact of the learning package and, in addition, several interviews were conducted with students using the learning package.

2.2. 2011 – 2020

Stage One: Teacher Centered Student Voice and Choice Teacher:

- Understand how each student learns best and make instructional decisions based on strengths, challenges, and interests

- Redesign classroom environments and universally design lessons and projects that encourage student voice and choice
- Wisely integrate technology into the curriculum to instruct all students based on how they learn best (Bray & McClaskey, 2013).

Second Stage: Learning centered with teachers and students as Co-Designers Teachers and students:

- Decide on skills and strategies for how they access information and express what they know
- Co-design lessons and projects to include student voice and choice
- Know how to select and use appropriate tools to support learning
- Switch to a competency-based system where students begin to demonstrate mastery of learning (Bray & McClaskey, 2013).

Third Stage: Learning oriented with the teacher as a partner in learning Students:

- Direct their learning based on their interests, aspirations and questions
- Learn at their own pace where they monitor progress with a constant feedback loop
- Design flexible projects that allow them to use their own voice and choose the best way to demonstrate mastery in competency-based learning (Bray & McClaskey, 2013).

2.3. 2021 – present

Personalized learning is an integrated approach to activities that is the product of self-organization (Chatti et al., 2010) or learning, or individual instruction that takes into account personal needs and goals. Personalized learning is considered an effective approach, which can increase student motivation, engagement and awareness (Falcão et al., 2018), as well as maximize student satisfaction and learning effectiveness (Gómez et al., 2014). Personalization as a basis for student-centered learning involves a high level of student involvement that shifts the focus of responsibility and expectations toward each student's strengths and weaknesses to create content that can meet those needs.

Personalized learning should involve the development of methodological and organizational support, as well as changes in the teacher's role. Students need psychological and pedagogical support to succeed in personalized learning; it has been found that emotional and psychological support from teachers is an

important factor in students' academic success (Tapalova et al., 2018). Personalized strategies aim to increase the modern student's reflexivity, autonomy, motivational focus, personal and social responsibility, and critical abilities. It can be seen as a holistic strategy that includes a large number of different educational practices that aim to teach students taking into account their strengths and weaknesses (Hachfeld & Lazarides, 2020; Tapalova, 2014).

The second important method for solving personalized and adaptive learning problems is formed through learning with the help of artificial intelligence (Khotimah & Priyanti, 2023). Intelligent tutoring systems have been developed for about fifteen years and have hundreds of specific applications, approaches and methods that have proven practical (Mousavinasab et al., 2018). The framework of intelligent tutoring systems includes a thorough study of the learning user, his individual psychological and cognitive characteristics, which allows not only to optimally distribute teaching materials and choose teaching methods, but also to create stronger involvement and motivation for each individual user of the system (Morgan et al., 2020; Yang & Zhang, 2019). Artificial Intelligence can also generate Multiple Representations of training information, making it easy to access training from any platform that is optimal for the user.

3. Implementation of personalized Education in digital settings

3.1 2000 – 2010

Much of the focus for students using this resource center is on the DiAL-e learning designs called 'Collaboration' and 'Authorship' (Burden & Atkinson, 2010). In each of these learning designs, students are asked to answer questions or solve problems using digital media resources as tools and surrounding resources to build knowledge and support. "Authorized" designs differ slightly from collaborative designs in that they require students to actually use and redirect the media themselves (Pratiwi et al., 2023; Weir, 2023), although this obviously requires access to specific time-based technologies in the space or context specific study. Students are also encouraged to demonstrate their comprehension and comprehension of topics they have prepared for by teaching others. The emphasis on microteaching of this nature reinforces much of the learning design we have incorporated into the DiAL-e Framework, which itself is dedicated to engaging students in meaningful, authentic and challenging practice.

The DiAL-e framework played an important role in each of the case studies described above, in providing professional development conversations about aspects of personalization (Burden & Atkinson, 2010). Case studies can be seen as examples of socio-technical activities represented by conversations in which it has been clearly recognized that: students are best engaged with care:

- thinking, imaginative learning experiences, not by content alone; teachers / educators have a central role to
- play a role in mediating the quality of students' experiences when technology is used; the value of digital resources as tools for
- engaging students lies in the dialogue experiences created around experience (Laurillard, 2012); Students need opportunities to think
- critically about their learning experiences to encourage them to change or alter their perspectives (Mezirow, 1978); space issues are important, but most are not
- exploration: a space is not defined only by its physical elements, but rather by the user's perception of learning in the space. In this case study, three different approaches to providing personalized experiences to students have been identified.

3.2 2011 – 2020

Step One: Understand Who Your Students Are and How They Learn Best

Teachers can determine the needs of each student by using Universal Design for Learn (UDL) principles to understand students' strengths, challenges, abilities, interests, talents and aspirations (Bray & McClaskey, 2013). UDL is often associated with special education (Rao et al., 2017), but it is a framework that applies to all students who have variability in their learning. UDL was originally designed for teachers to better understand their students. But students can also use UDL principles, with simplified language, to understand who they are as students and how they learn best. For them, we use the following terms:

- Access = multiple ways of representation
- Engagement = various ways to commit
- Expression = various ways of expression and action

Step Two: Designing a Personalized Learning Environment Step One
In stage one of the PLE, the teacher introduces student voice and choice.

- Teachers Who Know How Students Learn Best Apply UDL principles to lessons Redesign learning environments Integrate technology Design Evaluation Strategies
- Learners who Set learning goals with teachers Create personal learning plans Choose how to access content Have a voice that expresses knowledge Choose ways to engage with content (Bray & McClaskey, 2013).

To begin redesigning the learning environment to support how your students learn best, select four diverse students from your class and evaluate their student qualities. You can then set up multiple learning zones based on these qualities to give all your students choice in how to learn and express what they know and understand.

Step 3: Develop universally designed lessons

UDL provides a lesson blueprint for creating instructional goals, methods, materials, and assessments that work for everyone. This is not a one, one-size-fits-all solution but instead a flexible set of approaches that can be universally designed to meet the needs of each student.

If you are going to change learning so students have voice and choice, you involve them in unpacking and how they meet the standards, including the Common Core State Standards and NETS for Students. When students jointly design their learning strategies, they become better prepared for college and the workforce because they are more engaged in the learning process and can continue to use these skills throughout their lives.

In traditional classrooms, to meet the Common Core Reading Literature standards for Key Ideas and Details, third grade students read or listen to the same texts in the same way and are usually asked to respond in the same way as everyone else in the class (Bray & McClaskey, 2013).

Step Four: Facilitate Driver and Support Questions

The teacher asks students to ask further questions. They decided:

- Is there a right or wrong way to make the world more beautiful
- Does making something more beautiful make it better
- Can you make someone more beautiful
- Does being beautiful make people better

The class then prioritized the questions and ultimately chose one as their prompting question: Making something more beautiful makes it better. Students then work in pairs to develop supporting questions. The teacher combined Jared with Susan because he had difficulty focusing on text and difficulty organizing notes, and Susan's strengths included being able to stay on topic and to prioritize and organize elements in a story. Susan guided their brainstorming as a Jared type in a Google Doc, which is part of the Classroom Learning Toolkit available to all students (Bray & McClaskey, 2013).

Step Five: Select Tools, Resources, and Strategies for Learning and Teaching

In PLE, each student has access to a Personal Learning Backpack that includes a device and set of tools that can be used to support any assignment, task, or project. Students put together their own bags, with the help of their teachers, based on how they learn best and the resources and tools available to them. Once students understand how to select and use the right tools for any task, independent access and leadership become the foundation of their PLE.

The Personal Learning Backpack can also include a website and mobile device with a customized set of applications to support students to:

- Reading: Good Reader, Voice Dream, SpeakSelection
- Brainstorming: Popplet, SimpleMind, IdeaSketch, Inspiration
- Author: Storykit, Dragon Dictation, Book Creator
- Collaboration: Skype, Screenchomp, GoDocs
- Organization: DropBox, iHomework, Toodledoo
- Notes: Notability, Audio Note, Evernote
- Research: Dragon Go, Qwiki, WolframAlpha
- Presentations: Prezi, iMovie, Keynote, Educreations (Bray & McClaskey, 2013).

Step 6: Use Evaluation as Learning

At this point, the teacher transfers his role to that of a facilitator who guides students to become more independent so that they can set their own goals, monitor their own progress and reflect on their learning. Evaluation as learning is a process of developing and supporting metacognition for students. When students are actively engaged and critically evaluate their learning, they create information, connect it to previous knowledge, and use it for new learning. This is a regulatory process in metacognition. This occurs when students monitor their

own learning and use the feedback from this monitoring to make adjustments, adaptations, and even major changes in what they understand. This requires teachers to help students develop, practice, and become comfortable with reflection and with critical analysis of their own learning (Bray & McClaskey, 2013).

As they designed the recycling center, Susan and Jared reflected on their blog at KidsBlog and invited feedback from others. Jared loves using technology, so he captures images of trash around schools and recycling centers online and uses DropBox to upload them to his blog. When he gathered this as evidence to justify building a recycling center, he wrote a reflection about the process. He and Susan gathered all the evidence and reflections in a proposal for a recycling center that they presented to their class using Prezi.

Susan and Jared become learning partners with their teachers, which means they are more involved in lesson design and choosing the right tools to support their learning. And as a result, they become more engaged in the lesson and more motivated to learn.

3.3 2021 – present

The ARCS (Attention, Relevance, Confidence, Satisfaction) model aims to integrate and thus illustrate the relationship between the theoretical concepts of volition, motivation, learning, and performance to facilitate research and instructional design for creating motivating (online) learning environments. This model consists of four components: (1) attention related to the level of curiosity; (2) the relevance of the learning objectives to students, including perceived value; (3) confidence in the success of learning activities, including attribution of learning outcomes, and (4) satisfaction with the quality assessed from learning outcomes and the learning process. These four components are complemented by will, which includes self-regulation strategies to maintain purposeful behavior (Schumacher & Ifenthaler, 2018).

Psychologically, motivation to learn is described as a student's energy and aspirations to learn, work efficiently, and fulfill their potential along with the behaviors associated with these intentions. It should be emphasized that higher education curricula used to be based on cognitive approaches and not motivation theories; therefore, motivation to learn is still reduced. The Association for Medical Education in Europe guide on Motivation in Medical Education notes that medical students should be motivated in relation to the fact that they are

receiving a highly specialized education. Motivation is a key determinant of the quality and success of learning, a lack of which may explain why some medical students become disillusioned, discouraged, or leave. Therefore, it is very important to know what drives students to learn, as well as methods that can guide teachers to help them choose teaching approaches and ultimately influence student outcomes, including their retention in the Institution (Edgar et al., 2019).

CONCLUSION

The DiAL-e Framework is a toolkit that identifies various learning spaces and ten separate learning designs for students to engage with digital resources. This design is transferable and focuses on specific activities to develop skills or understanding. Personalized learning is an effective approach that focuses on individual instruction and personal needs, aiming to increase student motivation, engagement, and satisfaction. This involves a high level of student engagement, moving the focus to each student's strengths and weaknesses. The DiAL-e framework has been instrumental in providing a personalized learning experience to students. It emphasizes the importance of carefully thought out, imaginative learning experiences, focused on the dialogue experiences created around the experience. The ARCS model aims to integrate the relationships between willingness, motivation, learning, and performance to facilitate research and instructional design for creating motivated online learning environments. Motivation to learn is a key determinant of the quality and success of learning, and understanding what drives students to learn is critical for teachers to guide them in choosing teaching approaches and ultimately influence student outcomes, including their retention in institutions.

ACKNOWLEDGEMENTS

We would like to thank the parties who have helped to complete the preparation of this article, especially the presenters who have presented material on personalization of the digital environment, so that we can gain a better understanding of this matter. We also thank the lecturers who have helped provide input and direction regarding the content of the article, so that it becomes an article worthy of publication. Hopefully you will get blessings.

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