



# A Preliminary Study of Implementing Personalized Learning Instruction in EFL Classroom Benefits and Challenges

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## ABSTRACT

Digital technologies have been widely integrated into higher education as a vital learning aid, especially during the COVID-19 pandemic. Thus, teachers must use digital tools to personalize learning to meet the fifth industrial revolution. However, implementing personalized learning instruction in EFL classrooms through the learning management system (LMS) has been questioned from the standpoint of undergraduate students. Thus, this preliminary study investigates the benefits and challenges of implementing personalized learning instruction in Indonesian English as a Foreign Language (EFL) classrooms in higher education. This study utilized three project-based activities facilitated by a learning management system: the QUEST (Question Understand Educate Solution Teach) Project, Playlist Project, and Genius Hour Project. The questionnaires, self-assessments, and reflections of 15 undergraduates in a fully online course were used to gather the data. This group represents an EFL instruction in Indonesian higher education. The notable study has demonstrated that personalized learning instruction methods provide EFL students with various benefits and challenges. Significant benefits from the three projects in this study include learning, skills, ability, thinking, mindset, and personality traits. Besides, EFL students found substantial challenges in time management, task/assignment submission, assistance in collaborative work, late feedback, technical problems, and instruction understanding. This research expands knowledge on the student-teacher dynamic in personalized online learning. Further studies could examine other perspectives, such as the teacher's perspective and the model development. Investigating different perspectives may contribute to more comprehensive findings and enhance learning outcomes in personalized learning.

**Keywords:** Challenges, Benefits, EFL, Online learning, Personalized learning instruction.

## 1. INTRODUCTION

In the 21st century, personalization refers to instruction that tailors learners' learning styles, intelligence, and interest preferences (Gilbert & Han, 2002, cited in Samah et al., 2011). Consequently, if these disparities are considered, all learners will be given crucial challenges and possibilities for self-development and learning (Aviram et al., 2008; Jung & Graf, 2008, cited in Samah et al., 2011). Moreover, Bray and McClaskey (2015, cited in Netcoh, 2017) define a personalized learning environment as one in which students have a voice and choice. Students deeply engage in purposeful, genuine, and determined challenges to demonstrate desired outcomes (Zmuda et al., 2015). At the classroom level, personalized learning requires teachers to leverage technology (e.g., online curricula, learning management systems, videos) to provide a more student-centered experience (Bingham, 2017, cited in Bingham, 2019) and guide the student's journey (Bray & McClaskey, 2016). Bingham (2019) further elaborates that personalized learning uses technology to tailor instruction to students' needs and interests.

Some previous studies in personalized learning have been conducted in various contexts. In higher education, as reported by Yuyun and Suherdi (2023), personalized learning dominantly took place in the non-EFL classroom (67.5%) than in the EFL classroom (32.5%). To illustrate, Svenningsen et al. (2018) found that many students find computer-aided personalized instruction (CAPSI) beneficial to their knowledge. In addition, due to its adaptability, CAPSI is highly adjustable and can be implemented in various courses, locations, and levels. Meanwhile, in EFL, some studies, including Hsieh et al. (2012), Hsu et al. (2013), and Liman Kaban (2021), investigated how personalized learning enhanced students' English reading skills. Some promising results of implementing personalized learning in EFL are also revealed in speaking (Rahmani, 2015), vocabulary learning (Zou et al., 2020), and teaching English literature (Othman et al., 2015). Some profound implications of the previous studies indicate a great need for a significant change in the educational system regarding EFL teaching at the university level and integrating synchronous and asynchronous classrooms in personalized learning.

Regarding the Indonesian context, few studies have been conducted in vocational schools and higher education. To illustrate, Magfiroh (2017) found that the personalized learning model assisted by interactive multimedia effectively improves cognitive learning outcomes. In higher education, implementing personalized learning also impacts effective learning as it seeks behavior patterns of students' interests and talents to get a good assessment (Prabaswara & Ardiani, 2021). Herawati (2023) conducted a study to explore the experiences of English lecturers regarding the implementation of personalized learning in Indonesian higher education, particularly the challenges and advantages from the teachers' perspectives.

Based on previous studies, most research on personalized learning implementation focused on something other than the EFL context, particularly in Indonesia. Therefore, this preliminary study is conducted to know the EFL students' views on implementing personalized learning instruction in Indonesian higher education. More specifically, this study focused on the benefits and the challenges of implementing personalized learning instruction found in project-based activities.

## 2. LITERATURE REVIEW

This study was grounded on the theory of personalized learning to investigate the implementation of personalized learning instruction models in an online learning environment, particularly in the Indonesian EFL context.

### 2.1. *Personalized Learning in EFL Classroom*

Implementing personalized learning in EFL classrooms has been conducted at different levels, and language aspects are seen from students' and teacher's perspectives. From students' perspectives, early studies indicated using an e-portfolio system to contribute to the personalized understanding of two dyslexic higher-education learners (Hughes et al., 2011). It is suggested that bringing new possibilities regarding tangential thinking styles, interactive knowledge about learning, using forms of writing close to the conversation, and enabling learners to curate their writing. The new academic and literacy practices had remarkable pedagogical possibilities for dyslexic learners and supported e-portfolio practices in inclusive curricula.

Regarding EFL reading skills, a personalized English article recommending system has been developed using accumulated learner profiles to enhance learners' English ability and help maintain their learning interests (Hsieh et al., 2012). In line with Hsieh et al. (2012), Hsu et al. (2013) developed mobile-based learning to guide EFL students in reading articles based on students' preferences and knowledge levels. The distinction is a reading annotation module that allows students to record English vocabulary translations. Another study employing learning analytics is a personalized electronic reading approach for an EFL reading comprehension course to engage and motivate students with a personalized e-book reading program. Besides, providing personalized feedback encouraged more interaction (Liman Kaban, 2021).

Meanwhile, through personalized learning, L2 learners' interest in festive L2 speaking activities can help reach promising results (Rahmani, 2015). Besides, Zou et al. (2020) revealed that the Involvement Load Hypothesis/ILH and Technique Feature Analysis/TFA were more suitable than Spaced Learning/SL for facilitating personalized vocabulary learning via task recommendations. In teaching English literature, personalizing English literature learning for better performance in students' overall English Language results is suggested (Othman et al., 2015).

From the teacher's perspective, Hallman (2018) explores the reorientation of the teacher role and the repositioning of knowledge related to classrooms and students. To support classroom management, an English resource learning system based on individualized e-books provides a one-stop teaching management scheme for primary schools' English digital teachings, such as personalized resource pushing, learning method sharing, and learning statistics (Ding, 2018). Besides, Amro and Borup (2019) probed how teachers use the software, data, and resources to cater

their instruction to student's demands. This study indicated that teachers must provide students with tailored instruction utilizing the software's assessment data and resources. However, this study discovered some barriers, including time constraints, training, mentoring, and the inability to collect and analyze learning data and resources. Another study revealed that teachers consider personalized learning technologies a viable strategy to reduce the competence gaps in children's English reading (Bunting et al., 2021).

## 2.2. Personalized Learning Instruction

Instruction strategy in personalized learning focuses on students' needs, learning plans, potential, and flexibility in student learning (Association of Personalized Learning and Services, 2021) to promote mastery of skills and content (Bingham & Dimandja, 2017;) through the technology incorporation. This study adopted three project-based activities: the QUEST inquiry model, Genius Hour, and Playlist.

### 2.2.1. The QUEST Project

QUEST stands for Question, Understand, Educate, Solution, and Teach. This inquiry-based learning model introduces the fifth step to help educators and students practice connected learning (Wicks, 2017). First, personalize a question about the topic of interest. Second, understand the topic better by researching and sharing a resource. This phase requires students to practice and improve information literacy skills. Third, educate and learn from others about the topics through collaborating with your peers to resolve problems. Fourth, find a solution or resolution for the question by reflecting on what has been learned during the inquiry. Fifth, teach others about what has been learned by sharing it on social media. This phase enables students to practice connected learning by engaging an authentic audience with your solution and seeking feedback.

### 2.2.2. Genius Hour Project

Genius Hour enables students to pursue their interests or wonders and make a product based on that within a set amount of time. It is an idea coined by Google where employees are given 20% of their time at work to work on their projects (Daim, 2021). Daim further elaborates on the six steps for Genius Hour, as shown in Figure 1, including inspire, wonder, question, learn, share, and reflect.

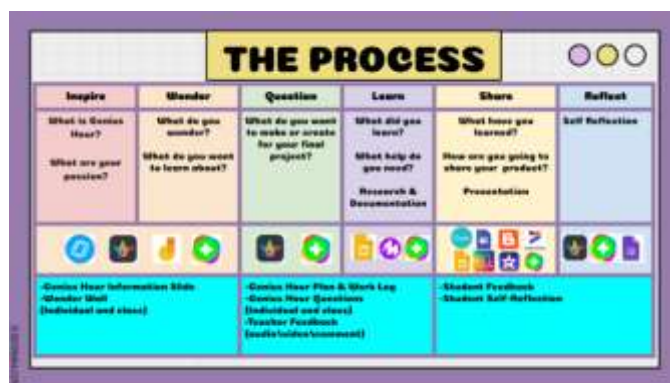


Figure 1 Genius hour process.

Simos (2015) discusses the Genius Hour project as an optimal learning relationship. Students embrace their power and responsibility in the learning process of working with teachers. They facilitate and guide students to explore a self-selected topic and research various resources. Students critically analyze the issue from several perspectives before incorporating their findings into a central concept. Then, this process terminates in a final product, project, or artifact (Kirr, 2014 cited in Simos, 2015).

Significant evidence supports the necessity of the Genius Hour model's greater emphasis on differentiation. A differentiated model allows teachers to use time flexibly, rely upon various instructional methodologies, and collaborate with their students to see what is learned. The learning environment is molded to the learner by focusing on current and future student interests (Tomlinson, 1999 cited in Simos, 2015).

Carter (2017) elaborates on six basic tenets of personalized instruction employed in the Genius Hour model, covering dual teacher roles, learning about your students, creating a collaborative, interactive learning environment, building flexible pacing but with structure, and creating authentic assessments.

### 2.2.3. Playlist Project

The playlist notion stems from the Individual Rotation approach, in which students work from a personalized list of activities. The playlist model aims to give students choices over their learning pace and path (Tucker, 2018). Teachers provide a template of all phases, additional scaffolding, and support when creating a playlist. The playlists mix the following elements: screencasts, offline activities, video explanations and instruction, online quizzes, personalized skill practice with online resources, pair practice, peer evaluation, self-evaluation, side-by-side assessments, and conferencing. As seen in Figure 2, this study adopted Tucker's (2018) playlist and developed it to address students' needs. This study developed a series of activities to personalize student's learning by reviewing a research journal article. This playlist project was conducted in the semester's first half and is considered a mid-test.

Path	Directions	Notes	Date Completed
1) Watch: What This Project & YouTube Video Presentation 	Watch the <a href="#">presentation</a> reviewing the experiences of a critical review of digital content. If you have questions about the assignment, post them HERE. You may also watch/read/listen to other related resources to deepen your understanding. If you have questions about the assignment, post them in the LFC forum discussion. Complete the Weekly Progress Report. Post your statement that you have completed all tasks in the forum discussion.	←	Provide teacher support to guide students through Report form review. Students can self-pace through information and exploration.
2) Analyze: Looking At Real-World Writing 	Read <a href="#">Reference 1</a> and <a href="#">Reference 2</a> to identify the aspects of the research article you selected. You may also watch/read/listen to other related resources to deepen your understanding. Post your statement that you have completed all tasks in the forum discussion.	←	Build a choice.
3) Analyze: Examine the Digital Content 	Take a sample research paper copy and use markers to color code the different parts of each paragraph. <b>Red</b> = Credibility <b>Blue</b> = Credibility <b>Green</b> = Double checking <b>...</b> etc. Complete the Weekly Progress Report. Post your statement that you have completed all tasks in the forum discussion.	←	Integrate online and offline activities/tasks.
4) Drafting 	Use <a href="#">this template</a> to begin your draft. Please make a copy of the template and share the link with me. Complete the Weekly Progress Report. Post your statement that you have completed all tasks in the forum discussion.	←	Provide teacher support to guide students.
5) Peer Review: Share your draft 	Share your draft to your peer(s) online using the follow link you shared with me. Now, you are expected to provide your feedback for your peer(s) draft. Please use the comment feature to provide your feedback. During reviewing please see <a href="#">Reference 1</a> and <a href="#">Reference 2</a> . Complete the Weekly Progress Report. Post your statement that you have completed all tasks in the forum discussion.	←	Facilitate peer collaboration to get feedback.
6) Teacher Help: Discuss with teacher 	Select an individual conference with the teacher to discuss and seek feedback. This conference is to monitor and discuss your Playlist Project. Please kindly share your preference to <a href="#">this link</a> . Post your statement that you have completed all tasks in the forum discussion.	←	Provide teacher support to identify students' needs and provide feedback.
7) Revise your draft 	Go back to the Google doc of your draft, which your friend(s) has reviewed. Make some adjustments accordingly. Make sure you follow the <a href="#">APA style</a> . Post your statement that you have completed all tasks in the forum discussion.	←	Customize the activities to accommodate feedback.
8) Edit: Grammar or other words 	After you have completed your revision, copy and paste your draft into Grammarly to check for spelling and grammatical errors. After you have corrected the errors highlighted by Grammarly, proceed to finalize your draft. Post your statement that you have completed all tasks in the forum discussion.	←	Provide other support to do self-learning by integrating technology.
9) Plagiarism Check: Turnitin 	Contact a librarian to ask for Turnitin service. The copying percentage is at most 10%. Please do not paraphrasing to minimize the similarity. Attach the Turnitin result in your <a href="#">appendices</a> . Complete the Weekly Progress Report. Post your statement that you have completed all tasks in the forum discussion.	←	Provide other support to do self-learning by integrating technology.
10) Finalize your draft 	Finalize your draft. Ask someone you trust to help you proofread the final copy of your paper. Ask them to give a score and comments on the <a href="#">Critical Review Rubric</a> . You may download or copy this file. Complete the Weekly Progress Report. Post your statement that you have completed all tasks in the forum discussion.	←	Facilitate peer collaboration to get feedback.
11) Self-Assessment 	Go to the <a href="#">Critical Review Rubric</a> , download or copy this file, then grade your paper using the rubric as a guide. What score would you give yourself on each element of the rubric? Write a reflection identifying three critical writing areas to improve in the next formal writing playlist, the challenges of doing this project, and lessons learned from the writing steps. Complete the Weekly Progress Report. Post your statement that you have completed all tasks in the forum discussion.	←	Provide a venue for self-reflection.
12) Submission 	Submit your final critical review paper and <a href="#">Critical Review Rubric assessment</a> (Peer Review and Self-Assessment) via LMS before the deadline.		

Figure 2 Critical review on research article playlist.

### ***2.3. Benefits of Personalized Learning***

With an upsurge in technology and the desire to improve the academic achievement of all students, there has been a wave of interest centered around personalized learning (Bingham et al., 2018). Thus, the importance of personalized education is recognized in research and practice. There are six essential aspects to classify the benefits of implementing personalized learning from students' views, including learning, skills, ability, thinking, mindset, and personality traits.

Regarding students' learning, personalized learning can efficiently maximize learner satisfaction, learning efficiency, and effectiveness (Gómez et al., 2014). Besides, personalizing learning can contribute to better learning results if students intend to develop better

learning strategies, skills, and technological capacities for individual and social learning activities and create learning communities with collaborative learning models (Järvelä, 2006).

Some studies pinpointed the benefits of personalized learning in improving students' skills. To illustrate, Järvelä (2006) found that personalized learning can improve the use of technology in education. When technology is seen as an intelligent tool for supporting individual learning and collaborative learning among different individuals, there are multiple ways to expand the learning potential of every student. Besides, personalized learning helps students develop deeper competencies, including critical thinking, problem-solving, collaboration, effective communication, and academic mindset development.

Personalized learning can efficiently increase students' personality traits, such as motivation, engagement, understanding (Pontual Falcão et al., 2018), interest, and engagement in learning activities (Järvelä, 2006). Personalized learning can consider contextual conditions; thus, different values and cultural features can be respected if the person and their needs are essential (Järvelä, 2006). As a progressively student-driven model, students deeply engage in purposeful, genuine, and determined challenges to demonstrate desired outcomes Zmuda et al. (2015).

Personalized learning inspires students' abilities, including curiosity and creativity (Järvelä, 2006). If students can develop their knowledge and individual expertise in areas where they need to be more competent or improve their knowledge, their interest in learning can be enhanced.

In addition, Svenningsen et al. (2018) claim that personalized learning fosters critical or higher-order thinking. Students are provided with or are referred to the course material (e.g., textbooks, manuals, written notes). The instructor also prepares a written study guide that includes the learning objectives and the study questions to focus students' attention on the essential conceptual material to be learned and the expectations placed on the students (Grant & Spencer, 2003).

### ***2.4. Challenges of Personalized Learning***

Some studies show obstacles and challenges in implementing personalized learning concerning the environmental and operational factors (Pane et al., 2017b), such as lack of administrator support, pressure to cover specific material, lack of data, lack of flexibility in curriculum, and scheduling constraints. Pressure to cover material and lack of flexibility in the curriculum are enormous obstacles for teachers in the national sample.

Netcoh (2017) reveals that challenges may be particularly pronounced for students and teachers with limited experience with school choice provision. This study offers guidance for teachers adopting personalized learning in their classrooms to maximize the opportunities associated with student choice. Specifically, teachers should emphasize personalized learning to bring their voices and choices to achieve learning outcomes collaboratively. Findings also suggest that some structure and constraints on choice may be necessary within personalized learning, particularly for students with limited experience making decisions about the design and enactment of their education.

An e-learning integration into an educational institution is complex as it needs the required infrastructure and support system (Cemal Nat et al., 2008). Also, technology should be designed explicitly to support activities in a learning environment instead of focusing strictly on content organization. The educational philosophy approach is more critical than selecting technology; however, this is only true in some e-learning systems. Additionally, it is significant to consider students' learning styles while developing an online course since a strong preference for the material presented negatively affects learners. This study infers a careful pedagogical design of the LMS in blended learning. The effectiveness of e-personalization methods has been demonstrated in this study, consisting of hypermedia resources and active methodologies such as PBL process-oriented feedback and self-assessment quizzes that facilitate learning outcomes and the acquisition of deep learning (Sáiz-Manzanares et al., 2019).

A specific challenge to personalized learning is that postsecondary education needs to adapt to larger class sizes, as found in the Ontario Confederation of University Faculty Associations in 2014 (Svenningsen et al., 2018). In assessing student outcomes over these changes, Monks and Schmidt (2010, cited in Svenningsen et al., 2018) found that class size had a statistically significant negative impact on the amount of critical and analytical thinking. A possible reason for this finding is that the instructor needs to pay more attention to individual students with larger class sizes, thus depersonalizing the learning experience. In addition to the decreased instructor attention, there needs to be more interaction between instructors and students and between students. As a result, the chance to assess student learning is often limited to true/false and multiple-choice tests, with decreased opportunities for the students to become critical thinkers (Svenningsen et al., 2018).

### **3. METHOD**

#### ***3.1. Design***

This study applied a mixed research method to combine different quantitative and qualitative data perspectives (a convergent design) to gain a complete picture of findings in context and add richer detail to conclusions (Creswell & Plano Clark, 2011 in Creswell, 2018). The scheme of this study is case study research, which aims to analyze the benefits and challenges of implementing personalized learning instruction in fully online EFL project-based activities. More to the point, the study used triangulation to ensure a prosperous result and increase the findings' reliability (Noble & Heale, 2019) through questionnaires and students' self-assessments and reflections to answer the research question.

The pedagogical design of this course was grounded on the framework of personalized learning, which aimed to promote students' voices and choices. The primary goal of this course is to assist learners in completing the various personalized learning instructions, including the inquiry-based QUEST, playlist, and genius hour project. The students complete the weekly progress report to monitor their learning path, self-assessment, and reflection after the project. Finally, students get familiar with various personalized learning instruction models at the end of the semester.

#### ***3.2. Research Context and Participants***

This study was conducted in an English department at an Indonesian university, particularly in the Curriculum and Technology Design course, which was given to senior students. This sample of the classroom involved 15 undergraduate students of the Curriculum and Technology Design course, which was purposefully selected owing to the project-based activities in a fully online class. The lecturer used a video conference platform (Zoom) for synchronous meetings and LMS for asynchronous meetings. A WhatsApp group was used to communicate throughout the semester. Regarding ethical considerations, the participants were notified about the study's objectives and confidentiality before completing the questionnaire.

#### ***3.3. Instrument***

This study gathered the data through a Likert scale questionnaire and students' self-assessments and reflections. First, a Likert scale and open-ended questionnaires were distributed to all participants via Google Forms. The questionnaire determined how students perceived the benefits and challenges of implementing personalized learning instruction in a fully online EFL course, particularly in three project-based assignments. Second, the students' self-reflections and assessments supported the questionnaire. The documents were well documented in LMS and Google Drive.

#### ***3.4. Data Analysis***

The data collected were then analyzed according to their nature and function. The primary data, i.e., the questionnaire, were analyzed using the personalized learning framework on its benefits according to Järvelä (2006), Gómez et al. (2014), Pontual Falcão et al. (2018), and Svenningsen et al. (2018). Meanwhile, the analysis of challenges in personalized learning is based on Netcoh (2017) and Pane et al. (2017a). Descriptive statistics were utilized to establish each questionnaire item's frequency and mean score from quantitative survey responses. The mean score on the Likert scale was then categorized using the developed categorization technique by Pimentel (2019). Table 1 summarizes the categorization.

**Table 1.** Criteria for descriptive analysis of the scales

Interpretation	Verbal Description	Range of Scale
Very low	Strongly Disagree	1.00 – 1.79
Low	Disagree	1.80 – 2.59
Moderate	Moderately Agree	2.60 – 3.39
High	Agree	3.40 – 4.19
Very high	Strongly Agree	4.20 – 5.00

Then, open-ended questionnaires and students' self-assessments and reflections were analyzed qualitatively through and after entirely collecting the data using thematic or coding analysis (Creswell, 2015; Miles et al., 2014). The accumulated valid and reliable data were systematically organized before coding. The final stage of qualitative analysis was synthesizing the study themes' entire coding and conceptualization process. Data processing, coding, and conceptualization processes were explored regarding the research objectives.

## 4. RESULTS AND DISCUSSION

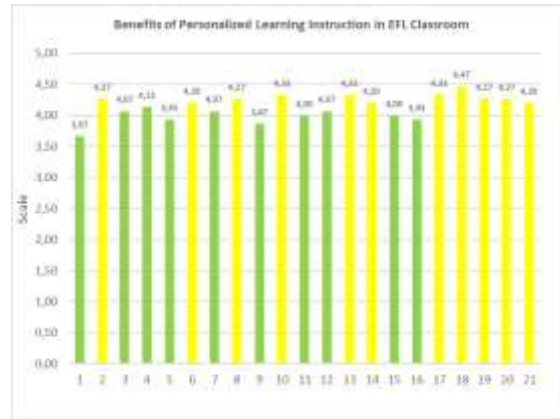
### 4.1. The Benefits of Implementing Personalized Learning Instruction in EFL Classroom

The first analysis covered the questionnaire data based on the framework of Järvelä (2006), Gómez et al. (2014), Pontual Falcão et al. (2018), and Svenningsen et al. (2018). The data was generated from a questionnaire of 15 participants whose mean score on the Likert Scale was then categorized based on Pimentel (2019). The second analysis was based on open-ended questionnaires, self-assessment, and reflection to support the Likert scale questionnaire results.

Based on the findings of the Likert scale questionnaire, the benefits obtained by Indonesian undergraduate EFL students in the implementation of personalized learning instruction are very high and high. From 21 Likert scale questionnaire items on personalized learning benefits, as seen in Table 2, the mean score of eleven (11) items is very high, and ten (10) items are high, as depicted in Figure 3.

**Table 2.** Questionnaire items on personalized learning benefits

No	Verbal Description
1	motivation
2	decision-making and self-advocacy skills
3	engagement
4	understanding
5	satisfaction
6	learning efficiency
7	learning effectiveness
8	expertise in the knowledge society
9	collaborative efforts
10	interest and engagement
11	Curiosity and creativity
12	growth mindset
13	develop better learning strategies
14	learning to learn skills
15	technological capacities for individual and social learning activities
16	create learning communities with collaborative learning models
17	respects different values and cultural features
18	the use of technology in education
19-20	supporting individual learning and collaborative learning
21	critical or higher-order thinking



**Figure 3** The mean score of personalized learning benefits indicators.

This finding implies that EFL students strongly agree they benefited from implementing personalized learning instruction in Curriculum and Technology Design project-based activities. They got benefits regarding decision-making and self-advocacy skills, learning efficiency, expertise in the knowledge society, interest and engagement, developing better learning strategies, learning to learn skills, respecting different values and cultural features, the use of technology in education, supporting individual learning and collaborative learning, and critical or higher-order thinking. Besides, EFL students agree they benefited from implementing personalized learning instruction regarding motivation, engagement, understanding, satisfaction, learning effectiveness, collaborative efforts, curiosity and creativity, growth mindset, technological capacities for individual and social learning activities, and creating learning communities with collaborative learning models.

Meanwhile, taken from the open-ended questionnaire, EFL students admitted that they benefited from implementing personalized learning instruction while working on three project-based activities: problem-solving, critical thinking, time management, collaboration with peers and teacher (feedback, resource sharing), creativity, and depth understanding. To illustrate, as the most significant benefit, EFL students admitted that they got an in-depth experience through the three project-based activities. For example, S8 learned new knowledge when reading resources to make a critical review paper in the Playlist Project and unique materials from the understanding phase in the QUEST project. Another significant benefit of implementing personalized learning instruction is improving creativity. EFL students considered that the personalized learning instruction in the QUEST project could improve creativity as they had to develop a question, research, share resources, and find a solution in the form of multimodal artifacts. As seen in Table 3, other students were on the same page that personalized learning instruction in the Genius Hour Project sharpened their creativity in developing an e-module for teaching English.

**Table 3.** An example of data taken from the open-ended questionnaire

	How do you benefit from the QUEST Inquiry-Based Learning model (Topic-based discussion)?	How do you get benefits from the Genius Hour Project (Critical Review of Research Paper)?	How do you get benefits from the Playlist Project (E-Module Development for Teaching English)?
S7	QUEST Inquiry-Based Learning model benefits me by paying attention to my group members' work since we are working on the same thing but have different ways or ideas about it. So, I learned a lot from my friends and also by managing my time.	Genius Hour Project benefits me by organizing the stuff I will be doing and planning the upcoming to-do list.	This project benefits me by pushing my creativity and discipline when working on the project.
S8	in this part, I got some benefits. For example, I found some new materials I did not know before.	I found some benefits here; for example, I learned new knowledge when I read some resources to make my paper.	I found that I can rate my creativity when I try to make some modules for teaching English to children.
S9	I got the benefit of thinking critically, giving questions and comments, reflecting, and sharing ideas with other friends related to the topic.	From the genius hour project, each section makes it easier for me to find out what I have done each week, the difficulties encountered, and what I will do for the following week in developing the e-module.	To develop my E-module
S10	My weakness is doing assignments as I please without a guideline. Through this method, I could follow step by step, even though, in the end, I could not follow the path.	Similar to the previous answer, this teaching method makes me more focused and work on projects step by step.	I could relearn and recall materials I had previously learned to include in the module. I also learned to make a helpful module for my target audience.
S11	From looking into other projects and advise	From reviewing others' project	By learning to make an e-module and getting advice from others



**Table 4.** An example of data from students' self-assessment and reflection

	<b>Benefits</b>	<b>Benefits</b>	<b>Benefits</b>
	How did you personalize the steps of learning in this project? Share your strategies to personalize and manage the learning process.	What did you like about this project or activity? What were you able to do well?	What did you learn about yourself? Strengths, interests, preferences, needs, and weaknesses.
S2	I managed the learning process by doing "Learn step by step. "It means I learned and created the e-module simultaneously, step by step.	I think I like working individually. I like to work alone.	My strength is working step by step. My interest is in the TOEFL subject. My preference, I like to work alone. My need I gather the references with a good quality book. My weakness is that I can get feedback.
S3	<ol style="list-style-type: none"> <li>1. I have read references for e-module samples</li> <li>2. I have tried out Any Flip as a potential platform that I might use to create the e-module</li> <li>3. I have struggled to find potential respondents who can fill in my survey form as formerly my intention was to create an e-module for young beginner-level English learners specifically for them in kindergarten, then changed to a survey and e-module explicitly designed for the needs of baristas when serving &amp; greeting customers in Flash Coffee, under PT Sembilan Puluh Enam Derajat.</li> <li>4. I have re-watched the recording of meeting 8 to make sure which type of questions would be beneficial for me to create the e-module.</li> <li>5. After finishing the survey and having sufficient responses, I plan to create the e-module.</li> </ol>	Creativity and freedom to create an e-module. It is fun, challenging, and interesting at the same time. I am not forgetting that creating this e-module is useful!	<p>My strengths and preferences are probably when I have changed my mind about the target of a group of learners. From beginner English level to specifically English 101 for Flash Coffee Baristas. I prefer to change the target because I have workmates who can help me be the survey respondents, and the strength is that I am a barista who encounters many interactions with customers who can only speak English.</p> <p>My weaknesses would be indiscipline in time management and labile in specifying the group of learners.</p>

Based on self-assessment and reflections, EFL students found the same benefits regarding problem-solving, critical thinking, time management, collaboration with peers and teacher (feedback, resource sharing), creativity, and depth of understanding. Interestingly, as depicted in Table 4, EFL students also found that they could identify their strengths, interests, preferences, needs, and weaknesses when completing the three project-based activities. They also found that implementing personalized learning instruction enhanced student agency, particularly in personalizing learning steps in the Genius Hour project within the second half of the semester. This project required students to record step-by-step activities in developing an e-module for teaching English. The record was reported in the LMS forum discussion.

In this study, 52% of the questionnaire items got very high mean scores, meaning EFL students strongly agree that they benefited from personalized learning instruction implemented in the three project-based activities. Notably, EFL students strongly agree that personalized learning instruction could improve the use of technology in education. This finding is in line with Järvelä (2006). Facilitated by the LMS and video conference, the Curriculum and Technology Design class was conducted in a fully online course, both synchronous and asynchronous sessions. Therefore, leveraging digital technologies, for instance, survey apps, presentation applications, and websites, is inevitable when implementing personalized learning instruction in the class.

Meanwhile, 48% of the questionnaire items got high mean scores, meaning EFL students agreed that they benefited from personalized learning instruction implemented in the three project-based activities. Remarkably, personalized learning increased their engagement in learning activities as they could control the learning paths to achieve established goals, building self-efficacy, critical thinking, and creativity. This point supports Pontual Falcão et al.'s study (2018). This finding is also strengthened by the open-ended questionnaire's result, revealing that improving creativity is a significant benefit of implementing personalized learning instruction. Most EFL students considered that the personalized learning instruction improved their creativity in the QUEST and Genius Hour projects. Those projects required students to create various presentations based on their preferences and interests. To illustrate, students can choose visual displays during the QUEST project, such as infographics and posters; audio-visual presentations, such as video; or audio presentations, such as podcasts. Meanwhile, to develop an e-module for teaching English in the Genius Hour project, students can select learner targets, language skills, resources, teaching methods, activities, and tools to create interesting audio-visual e-modules. In this case, students control their learning paths to complete the assignments through personalized learning instruction.

In addition, EFL students admitted they got an in-depth understanding through the three project-based activities. For example, they learned new knowledge when reading resources to make a critical review paper in the Playlist Project and unique materials from the understanding phase in the QUEST project. Consequently, personalized learning could maximize learning effectiveness (Gómez et al., 2014) and increase their growth mindset as they get more engaged and open to thinking outside the box (Järvelä, 2006).

These findings show clear evidence that the EFL learners in Indonesian higher education perceived implementing personalized learning instruction in project-based activities benefits significantly their learning (strategies, collaboration, individual, efficiency, effectiveness), skills (decision-making, self-advocacy, technology, problem-solving), ability (creativity, curiosity, expertise, understanding), thinking (critical, higher-order), mindset (growth), and personality traits (time management, collaboration, motivation, engagement, interest, respect, self-efficacy).

The present study also reported exciting findings regarding the benefits of implementing personalized learning instruction in EFL classrooms, as revealed by students' self-assessments and reflections. As seen in Table 4, EFL students could identify their strengths, interests, preferences, needs, and weaknesses when completing the three project-based activities. This exciting point postulates previous studies by Bingham and Dimandja (2017). Besides, students also found that implementing personalized learning instruction enhanced student agency, particularly in personalizing learning steps in the Genius Hour project. In this project, students must drive their learning choices in developing an e-module for teaching English; thus, they control their learning paths to achieve learning goals with the support of teachers and peers.

#### ***4.2. The Challenges of Implementing Personalized Learning Instruction in EFL Classroom***

The first analysis covered the questionnaire data based on Netcoh's (2017) and Pane et al.'s (2017a) framework. The data was generated from a questionnaire of 15 participants whose mean score on the Likert Scale was then categorized based on Pimentel (2019). The second analysis was based on open-ended questionnaires, self-assessment, and reflection to support the Likert scale questionnaire results.

Based on the findings of the Likert scale questionnaire, the challenges faced by Indonesian undergraduate EFL students in the implementation of personalized learning instruction are very high, high, and moderate. From 12 questionnaire items on personalized learning challenges, as seen in Table 5, the mean score of one (1) item is very high, five (5) items are high, and six (6) items are moderate, as depicted in Figure 4. These findings indicate that EFL students strongly agree that they found significant challenges with time management when completing personalized learning tasks. Besides, EFL students agree that some challenges are pressure to cover specific material, limited experience with school choice provision, tasks and assignments submission, assistance during collaborative works, and late feedback. In addition, EFL students moderately agree that they needed more administrator support, data, flexibility in curriculum, scheduling constraints, technical problems, and instruction understanding.

**Table 5.** Questionnaire items on personalized learning challenges

<b>No</b>	<b>Verbal Description</b>
1	Lack of administrator support
2	Pressure to cover specific material
3	Lack of data
4	Lack of flexibility in the curriculum
5	Scheduling constraints
6	Limited experience with school choice provision
7	Time management
8	Tasks and assignments submission
9	Provide assistance during collaborative works
10	Late feedback
11	Technical problems
12	Understand the instruction

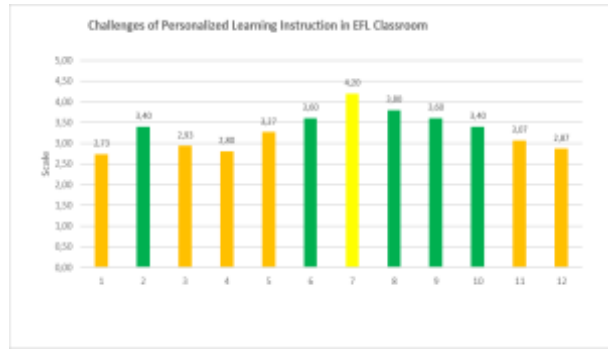


Figure 4 The mean score of personalized learning challenges indicators.

Meanwhile, taken from the open-ended questionnaire, EFL students admitted that they faced some challenges regarding time management (late submission), searching for resources and applications, working with peers (late feedback), understanding the instruction, and brainstorming ideas. To illustrate, EFL students admitted time management as the most significant challenge. As seen in Table 6, completing all the tasks on time was hard when having an internship and a dozen works (S7). Besides, EFL students considered brainstorming ideas challenging, particularly in completing the Playlist and Genius Hour projects.

Table 6. An example of data taken from the open-ended questionnaire.

	What problems and challenges did you find when completing tasks and assignments using the QUEST Inquiry-Based Learning model (Topic-based discussion)?	What problems and challenges did you find when completing tasks and assignments using the Playlist Project (Critical Review of Research Paper)?	What problems and challenges did you find when completing tasks and assignments using the Genius Hour Project (E-Module Development for Teaching English)?	What should be improved from the implementation of the three PL Instruction models? Be more specific.
S6	The problem and challenges I find when completing tasks and assignments using the QUEST inquiry-based learning model are that I often need help when I want to continue to the next step because my group mates are often late working on it. Besides that, one of my group mates did not do the assignment according to the instructions, which made me lazy to give him feedback. Meanwhile, for challenges, I sometimes need help following deadlines for assignments because the time allotted is quite tight, and I am busy with office work.	Issues and difficulties I found when completing tasks and assignments using the Genius Hour Project (Critical Review of Research Paper) are a broad theme; sometimes, I have many questions and am confused about where to start first.	Problems and challenges I found when completing tasks and assignments using the Playlist Project (E-Module Development for Teaching English) in the early stages because I was confused about where to start first	So far, implementing the three PL Instruction models should not improve anything since PL Instruction is advantageous to my learning. External factors must be considered, <b>specifically the students receiving PL instruction. For instance, because one of the group members is late completing the PL Instruction, the other group members are also late.</b> Another external thing is one of the group members who does PL instruction not according to orders (topics), which causes other students to be lazy to give responses.
S7	Since I am doing my internship, time management is a problem.	The problems I found were time management and brainstorming ideas for the materials.	Creating activities for students is quite stressful and requires much creativity.	I think it is already a good learning model; the problem is on myself for not putting in more effort.
S8	I was initially confused about following the lesson, but I can follow it at the next meeting.	When I wanted to make my paper, it was hard to choose some topics and how to build them into the paper.	The problem is that I have to make the module more exciting and easier to use so the teacher can teach their learners easily.	It is already good, but <b>sometimes, it pushes us to be more aware of the commands.</b>
S9	I have difficulties in managing my time during my training	I have difficulties in managing my time during my training	I have difficulties using a platform to design the E-book	In my opinion, <b>the QUEST learning models need more ideas and topics.</b>

Based on self-assessment and reflections, EFL students found the same challenges as in the open-ended questionnaire: time management (late submission), searching for resources and applications, working with peers (late feedback), understanding the instruction, and brainstorming ideas. However, the most significant challenge is different. As depicted in Table 7, EFL students found that searching for resources or applications was the most critical challenge in the three project-based activities. Also, EFL students considered working with peers, mainly when they got late feedback in the QUEST project, another significant challenge in implementing personalized learning instruction.

**Table 7.** An example of data from the student's self-assessment and reflection

	<b>Problems or challenges I found:</b>	<b>Problems or challenges I found:</b>	<b>Problems or challenges I found:</b>
S8	In my opinion, I am struggling to catch up with the reading resources I got from my peers.	I have posted infographic, comments, and feedback. However, it is permanently gone.	To keep up with the further readings
S9	As for me, it is challenging to understand the reading materials.	Sometimes, I am confused about the instructions. However, I will try my best to catch up with it.	To find the appropriate sources for other group members
S10	Time management and information gathering	I did not have too many problems while working on this chapter. However, one of my peers did not work, so I did not give any comments.	I have difficulties in managing my time. So, I was late to submit my assignment.

In this study, the result of the Likert-scale questionnaire shows various data. Only 8% have a very high mean score, 42% have a high mean score, and 50% have an average mean score. This data means EFL students strongly agree, agree, and moderately agree that they had challenges implementing personalized learning instruction in the three project-based activities. EFL students strongly agree that time management was challenging while implementing personalized learning instruction. This finding has yet to be revealed in previous studies. They agree that some challenges were found in submitting tasks and assignments, assistance during collaborative work, late feedback, pressure to cover specific material, and limited experience with school choice provision. As revealed by the previous study, some challenges regarding the environmental and operational factors are also found in this current study, such as lack of administrator support, pressure to cover specific material, lack of data, lack of flexibility in curriculum, and scheduling constraints (Pane et al., 2017a). Also, aligning with Netcoh's study (2017), this current study reveals that challenges may be particularly pronounced for students and teachers with limited experience with school choice provision. From these findings, it is evident that in the Indonesian EFL context, some new challenges are found in this current study, such as in task and assignment submission, assistance in collaborative work, late feedback, technical problems, and instruction understanding.

The present study also reported time management as the most consistent challenge in implementing personalized learning instruction in the three project-based activities. This finding is consistently found in Likert-scale questionnaires, open-ended questionnaires, and students' self-assessments and reflections. However, various significant challenges are revealed in the Likert-scale questionnaire, open-ended questionnaire, and students' self-assessments and reflections. For instance, EFL students found that searching for resources or applications was the most significant challenge in the QUEST project. Meanwhile, EFL students considered brainstorming ideas another significant challenge in implementing personalized learning instruction during the Playlist and Genius Hour projects.

## 5. CONCLUSION

Based on the study's findings, EFL students view that implementing personalized learning instruction in project-based activities has various benefits and challenges. EFL students benefited significantly from implementing personalized instruction regarding their learning, skills, ability, thinking, mindset, and personality traits. Meanwhile, EFL students found that time management is the most consistent challenge in implementing personalized learning instruction in the three project-based activities. Interestingly, this study contributes new findings regarding challenges in implementing personalized learning instruction, such as time management, task/assignment submission, assistance in collaborative work, late feedback, technical problems, and instruction understanding. The pedagogical implication of the study covers the importance of well-designed EFL courses to get more benefits and minimize potential challenges in implementing personalized learning instruction.

However, these studies have some limitations. The most significant is that this result cannot be generalized, considering the circumstances. Thus, this study leaves a considerable challenge involving various respondents to gain

more comprehensive data for further investigation. Further studies on other perspectives, such as the teacher's perspective and the model development, may yield more thorough results.

## AUTHORS' CONTRIBUTIONS

IY drafted the manuscript and created all graphs and tables. NSL, ILD, and FNY proofread the article. The final manuscript has been read and approved by all writers.

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## REFERENCES

- Amro, F., & Borup, J. (2019). Exploring Blended Teacher Roles and Obstacles to Success When Using Personalized Learning Software. *Journal of Online Learning Research*, 5(3), 229–250.
- Association of Personalized Learning and Services. (2021). *Experience Personalized Learning*. Association of Personalized Learning and Services. <https://theaplus.org/personalized-learning/>
- Bingham, A. J. (2017). Personalized learning in high technology charter schools. *Journal of Educational Change*, 18(4), 521–549.
- Bingham, A. J. (2019). A Look at Personalized Learning: Lessons Learned. *Kappa Delta Pi Record*, 55(3), 124–129.
- Bingham, A. J., Pane, J. F., Steiner, E. D., & Hamilton, L. S. (2018). Ahead of the Curve: Implementation Challenges in Personalized Learning School Models. *Educational Policy*, 32(3), 454–489.
- Bray, B., & McClaskey, K. (2016). *Personalization vs. Differentiation vs. Individualization Report (PDI) v3*. <https://barbarabray.net/download/pdi-report-version-3/>
- Bunting, L., af Segerstad, Y. H., & Barendregt, W. (2021). Swedish teachers' views on using personalized learning technologies for teaching children reading in the English classroom. *International Journal of Child-Computer Interaction*, 27, 100236.
- Carter, N. (2017). *Genius Hour and the 6 Essentials of Personalized Education | Edutopia*. [http://www.edutopia.org/blog/genius-hour-essentials-personalized-education-nichole-carter?utm\\_source=facebook&utm\\_medium=post&utm\\_campaign=blog-genius-hour-essentials-personalized-education-link](http://www.edutopia.org/blog/genius-hour-essentials-personalized-education-nichole-carter?utm_source=facebook&utm_medium=post&utm_campaign=blog-genius-hour-essentials-personalized-education-link)
- Cemal Nat, M., Dastbaz, M., & Bacon, L. (2008). Research and Design Challenges for Developing Personalised eLearning Systems. In C. Bonk, M. Lee, & T. Reynolds (Eds.), *Proceedings of E-Learn 2008--World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 2536–2542). Association for the Advancement of Computing in Education (AACE). <https://www.learntechlib.org/p/30026/>
- Creswell, J. (2015). *Educational Research - Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (Fifth Edit). Pearson Education, Inc.
- Creswell, J. W. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th Editio). SAGE Publications Inc.
- Daim, L. A. M. (2021). *Genius Hour Online Edition Step by Step Guide*. <https://techfulofprimary.com/2021/08/genius-hour-online-edition-step-by-step-guide/>
- Ding, L. (2018). Exploration of key technologies in a personalized English learning system. *International Journal of Emerging Technologies in Learning*, 13(7), 85–96.
- Gómez, S., Zervas, P., Sampson, D. G., & Fabregat, R. (2014). Context-aware adaptive and personalized mobile learning delivery supported by UoLmP. *Journal of King Saud University - Computer and Information Sciences*, 26(1), 47–61.
- Grant, L. K., & Spencer, R. E. (2003). The personalized system of instruction: Review and applications to distance education. *International Review of Research in Open and Distance Learning*, 4(2), 80–99.

- Hallman, H. L. (2018). Personalized learning through 1:1 technology initiative: implications for teachers and teaching in neoliberal times. *Teaching Education*, 62(10), 1–20.
- Herawati, A. (2023). Personalized Learning in Teaching English as Foreign Language: Limiting the Challenges, Increasing Its Effectiveness. In U. Widiati et al. (Ed.), *Proceedings of the 20th AsiaTEFL-68th TEFLIN-5th iNETAL Conference (ASIATEFL 2022)* (pp. 3–12). Atlantis Press SARL.
- Hsieh, T. C., Wang, T. I., Su, C. Y., & Lee, M. C. (2012). A Fuzzy Logic-based Personalized Learning System for Supporting Adaptive English Learning. *Educational Technology and Society*, 15(1), 273–288.
- Hsu, C. K., Hwang, G. J., & Chang, C. K. (2013). A personalized recommendation-based mobile learning approach to improving the reading performance of EFL students. *Computers and Education*, 63, 327–336.
- Hughes, J., Herrington, M., McDonald, T., & Rhodes, A. (2011). E-portfolios and personalized learning: Research in practice with two dyslexic learners in UK higher education. *Dyslexia*, 17(1), 48–64.
- Järvelä, S. (2006). Personalized Learning? New Insights into Fostering Learning Capacity. In *PERSONALISING EDUCATION* (p. 126). Organization for Economic Co-operation and Development.
- Liman Kaban, A. (2021). EFL Students' Personalized Reading Experiences and its Influence on Engagement and Online Presences. *Shanlax International Journal of Education*, 9(4), 196–209.
- Magfiroh, T. A. (2017). *Implementasi Model Personalized Learning Berbantuan Multimedia Interaktif untuk Meningkatkan Hasil Belajar Siswa SMK* [Universitas Pendidikan Indonesia].
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative Data Analysis: A Methods Sourcebook. Third Edition*. SAGE Publications, Inc.
- Netcoh, S. (2017). Balancing freedom and limitations: A case study of choice provision in a personalized learning class. *Teaching and Teacher Education*, 66, 383–392.
- Noble, H., & Heale, R. (2019). Triangulation in research, with examples. *Evidence-Based Nursing*, 22(3), 67–68.
- Othman, N. I., Shah, P. M., Karim, A. A., Yusof, A., Din, R., Ramli, N. A., & Salleh, N. S. (2015). Personalizing learning of English literature: Perceptions and challenges. In *Journal of Personalized Learning* (Vol. 1, Issue 1).
- Pane, J., Steiner, E., Baird, M., Hamilton, L., & Pane, J. (2017a). How Does Personalized Learning Affect Student Achievement? *How Does Personalized Learning Affect Student Achievement?*
- Pane, J., Steiner, E., Baird, M., Hamilton, L., & Pane, J. (2017b). Observations and Guidance on Implementing Personalized Learning. *Observations and Guidance on Implementing Personalized Learning*.
- Pimentel, J. L. (2019). Some Biases in Likert Scaling Usage and its Correction. *International Journal of Sciences: Basic and Applied Research (IJSBAR)*, 45(1), 183–191.
- Pontual Falcão, T., Mendes de Andrade e Peres, F., Sales de Moraes, D. C., & da Silva Oliveira, G. (2018). Participatory methodologies to promote student engagement in the development of educational digital games. *Computers and Education*, 116, 161–175.
- Prabaswara, A., & Ardiani, H. R. (2021). Penerapan Sistem Personalized Learning Berbasis Big Data Secara Integratif Guna Mewujudkan Pendidikan Indonesia Yang .... In *Kumpulan Karya Tulis Ilmiah Tingkat Nasional 2021 Institut Teknologi Telkom Surabaya*.
- Rahmani, A. (2015). Personalized versus normal practice of L2 speaking on Iranian EFL learners' oral proficiency. *International Journal of Applied Linguistics and English Literature*, 4(2), 151–157.
- Sáiz-Manzanares, M. C., García Osorio, C. I., Díez-Pastor, J. F., & Martín Antón, L. J. (2019). Will personalized e-learning increase deep learning in higher education? *Information Discovery and Delivery*, 47(1), 53–63.
- Samah, N. A., Yahaya, N., & Ali, M. B. (2011). Individual differences in the online personalized learning environment. *Educational Research and Reviews*, 6(7), 516–521. <http://www.academicjournals.org/ERR>
- Simos, E. (2015, August). Genius Hour: Critical Inquiry and Differentiation. *English Leadership Quarterly*, 1–3.
- Svenningsen, L., Bottomley, S., & Pear, J. J. (2018). Personalized learning and online instruction. In R. Z. Zheng (Ed.), *Digital Technologies and Instructional Design for Personalized Learning* (Issue May, pp. 164–190). IGI.

- Tucker, C. (2018). *Playlists: A Path to Personalizing Learning*. <https://catlintucker.com/2018/05/playlists/>
- Wicks, D. (2017). *The QUEST model for inquiry-based learning*. <https://davidwicks.org/iste-2-design-and-develop-digital-age-learning-experiences-and-assessments/quest-model-for-inquiry-based-learning/>
- Yuyun, I., & Suherdi, D. (2023). Components and Strategies for Personalized Learning in Higher Education: A Systematic Review. In U. Widiati et al. (Ed.), *Proceedings of the 20th AsiaTEFL-68th TEFLIN-5th iNELTAL Conference (ASIA TEFL 2022)* (Vol. 2, pp. 271–290). Atlantis Press.
- Zmuda, A., Curtis, G., & Ullman, D. (2015). *Learning personalized: The evolution of the contemporary classroom*. Jossey-Bass.  
[https://books.google.co.id/books?id=8Y9xBgAAQBAJ&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=true](https://books.google.co.id/books?id=8Y9xBgAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=true)
- Zou, D., Wang, M., Xie, H., Cheng, G., Wang, F. L., & Lee, L. K. (2020). A comparative study on linguistic theories for modeling EFL learners: facilitating personalized vocabulary learning via task recommendations. *Interactive Learning Environments*, 0(0), 1–13.

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