

Amotivation in AI injected EFL classrooms: Implications for teachers

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ABSTRACT

Motivation is an essential aspect of students' success in their learning, and an investigation into the factors that could deteriorate their motivation could shed light on that issue. This study investigates amotivation during the application of artificial intelligence technology in EFL classrooms or AI-injected learning. As artificial intelligence is still a relatively new technology, but its application is becoming increasingly more prevalent in language classrooms, this study aims to explore factors that could negatively affect EFL students' motivation to use technology in their learning. This study included questionnaires and interviews to collect data from 133 EFL students in an Indonesian higher education institution. The students had experience working with AI applications in their learning. The statistical analysis of the questionnaire data suggested that, although not dominant, amotivation was evident among the students. More than 25% of the students experienced amotivation while learning using AI apps. The qualitative analysis of the interview data revealed three factors that could give rise to amotivation among the students when working with the AI apps: intelligence, user interface, and lesson design. Intelligence and user interface were internal to the AI apps, while lesson design was associated with the teachers' pedagogical competence in preparing the lessons for their students. This study suggests that app design and lesson design are two motivational factors that could affect students' motivation in AI-injected learning.

Keywords: Amotivation; artificial intelligence; CALL; EFL classrooms; SDT

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INTRODUCTION

Technology is advancing rapidly and affecting various aspects of human lives, including education and language classrooms. The most relatively current technology being applied in education is artificial intelligence (AI). The practice has been labeled as AI-injected e-learning and is the future of education (Montebello, 2018). AI and its automation feature could help teachers in preparing, conducting, managing, and evaluating their lessons. There are some web-based AI apps for these purposes, for example, www.lessonwriter.com and www.lessonplans.ai. For students, AI could further

promote a more personalised learning experience, realising the goal of the precision education initiative (Hart, 2016).

However, studies suggest that students' learning experiences with AI did not always end with positive results. Gallacher et al. (2018), for example, found that AI chatbots lack the richness of interaction in human conversation. Pace-Sigge and Sumakul (2022) also found that the language produced by an AI app could be considered non-natural and unsuitable. Sumakul (2023) further suggests that engagingness, valuableness, and localisation are some aspects of AI-injected

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classrooms that could affect students' learning. Correspondingly, these aspects could be both beneficial or harmful to students' motivation in learning. If not anticipated or well managed, these aspects can potentially deteriorate students' learning. This could happen when students' motivation is decreased or even gone when they are learning. In Deci and Ryan's (1985) Self Determination Theory (SDT), the absence of motivation is known as amotivation.

As AI is getting more common and inevitable, there are still aspects of AI technologies that could prevent students from being successful in their learning. This study was aimed at investigating the amotivation in AI-injected learning environments in two EFL classrooms used in this study by examining the aspects of AI-injected learning that could affect students' motivation. It was expected that the results of this study could shed light on what might have caused the amotivation so it could be anticipated and managed. For that purpose, this study employed the following research questions: 1) Is there any amotivation evidence among the EFL students who participated in the AI-injected EFL classrooms? 2) What are the amotivating factors of AI-injected learning in EFL classrooms?

Artificial Intelligence (AI)

AI is concerned with machines that have human intelligence (Luckin et al., 2016). Similarly, synthesising various existing definitions, Russel and Norvig (2016) suggest that AI is intelligent machines that have the ability to think and act in these manners: humanly and rationally. As AI machines are designed to model human thoughts and behaviors, in language classrooms, AI would think and act like language teachers (Matthews, 1993). On many occasions, AI should be able to perform the roles of the language teacher.

The history of the development and use of AI in language classrooms, AI has already been part of the evolution of Computer Assisted Language Learning (CALL) since the 1960s, and is known as intelligent CALL or iCALL (Lu, 2018). In its recent developments, such as natural language processing (NLP), machine learning (ML), neural networks, and speech recognition (Luckin et al., 2016), current AI can analyse, understand, and produce human language (Lu, 2018). This concept applies to both the written and spoken forms of human language. Correspondingly, today's AI apps can talk to students, understand them, give feedback on their speaking, and mark their writing assignments. For example, there is Elsa which could help students learn pronunciation, Grammarly for Grammar, Plot Generator for writing, and Orai for public speaking.

Nevertheless, there have been different opinions about the applications of AI in language classrooms. Some studies extol the advantages of AI in language learning. For instance, AI has been

found to be beneficial for students' grammar (Kim, 2019; Matthews, 1993), speaking (El Shazly, 2021; Haristiani, 2019), listening (Ghoneim & Elghotmy, 2021), writing (Sumakul et al., 2022a; Tafazoli et al., 2019), soft skills (Sumakul et al., 2022b), and motivation (Haryanto, 2019; Yin et al., 2021). These studies look at AI as technological tools that could bring positive impacts to language learning. They are in line with Kannan and Munday's (2018) summary in their paper that AI has the potential to offer benefits to second language studies.

Some other studies, however, propose dissenting voices. For example, Gallacher et al. (2018) suggest that AI is not a legitimate learning tool in language classrooms. It is based on their findings that AI-powered chatbots are still lacking in their richness in interactions. Similarly, Pace-Sigge and Sumakul (2022) claim that the language produced by AI is unnatural in some circumstances. Moreover, Wilson et al. (2021) state that AI might decontextualise language production. Although these issues might come from the limited pedagogical design of the apps (Rieland, 2017) or their limited connection to substantial theoretical grounds (Zawacki-Richter, 2019), these flaws could serve as the amotivating factors for language learners. These amotivating elements are also referred to as amotivation. Amotivation is the term used in Self Determination Theory (Deci & Ryan, 1985) to explain the non-existent of motivation.

Self Determination Theory (SDT)

Morphologically, amotivation could be easily understood as the opposite of motivation. The Ancient Greek prefix "a" in the word amotivation suggests that it is a state or condition without motivation. This quick morphological analysis is correct, but within the context of this paper, this concept is better viewed from psychological perspective.

Amotivation is a term suggested by Edward L. Deci and Richard M. Ryan, two prominent researchers on motivation studies from the University of Rochester, New York, in their Self Determination Theory (SDT). SDT focuses on the direction of behaviour. Deci and Ryan (1985) explain that self-determination "... is the capacity to choose and to have those choices, ... be the determinants of one's action (p. 38). In other words, how self-determined a person is in performing a particular behaviour determines the types of motivation they are experiencing when conducting the activity. In SDT, motivation is about the choice one has in performing an activity. This choice could come from both internal and external factors.

Regarding the types of motivation based on the self-determined levels, SDT recognises three major types of motivation, as presented in Figure 1. These three types of motivation occur in a continuum of less to more self-determined levels of motivation.

The figure indicates that the most self-determined form of motivation is intrinsic motivation. It is positioned at the right end of the continuum. The ones in the middle are the different types of extrinsic motivation. Some types are more self-determined, while some are less self-determined. Meanwhile, amotivation is at the far left of the continuum, indicating it is the least self-determined type of motivation.

The continuum shows how people experience motivation in a behaviour. To put it another way, it indicates how behaviour is internalised. Amotivation is located at the least self-determined end of the continuum. In contrast to intrinsic and extrinsic motivation, where behaviour is performed based on various internal and external factors, amotivation occurs when there is no perceived competence or lack of values when an activity is performed.

Amotivation occurs when there is no willingness to perform an activity. It is a state of helplessness (Deci & Ryan, 1985) or lack of intentionality (Ryan & Deci, 2020). Amotivation could be experienced when people feel no connection between the action and the outcomes of the action. This feeling could happen due to the feeling of incompetence or judgment that the action is invaluable (Ryan & Deci, 2020), or low self-efficacy (Graham, 2022; Robinson et al., 2019). In such situations, people might think that however they do the action, the results will be unchanged. The explanations above indicate that could come from within the individual. However, amotivation could also be caused by external factors. In relation to this, Deci and Ryan (1985) emphasise that events could be both internally and externally amotivating but the effect is just the same. In the context of amotivation, whether the factors come from inside or outside the individual, the effect is the same: the absence of motivation. Ryan (2019) calls this “a lack of initiative to act” (p. 200).

As motivation is vital in language learning and technology is also an essential aspect of language motivation studies, this study looked at how the use of AI technology in EFL classrooms could affect students' motivation. Moreover, this study focused more on the amotivating factors of AI-injected learning. This study is expected to reveal these amotivating factors and how they occur. Teachers could use the results of this study as things to consider in utilising AI in their teaching practices.

METHOD

This paper is a part of a larger study looking at L2 motivation in AI injected language learning environments. This paper, however, elaborates specifically on the amotivation topic. This study was conducted at a university in Indonesia, involving 163 students enrolled in two EFL courses

integrating AI apps in the learning activities. They were 67 students from pronunciation classes and 66 students from writing classes. The selection of the participants in this study is in line with Creswell and Plano Clark (2018), who state that the selection of research participants should involve some considerations, such as the participants' knowledge and experience with the research topic. The students' experiences in learning with the AI apps were the critical consideration relevant to the topic of this study.

Regarding the AI apps, the Elsa app (<https://en.elsaspeak.vn/>) was used in the pronunciation class, while the Plot Generator app (<https://www.plot-generator.org.uk/>) was used in the writing class. The Elsa app was used in complementary activities outside the regular class meeting for the whole semester. The students accessed the app individually using their mobile phones. When using the Elsa app, every student was required to complete a pre-test provided by the app. During the pre-test, the student was asked to read aloud some sentences. The app recorded these sentences and later analysed them to measure the student's proficiency level. The result of this pre-test was used to develop an individual lesson plan unique to the student. All students would have different lesson plans based on their pre-test results.

Meanwhile, the Plot Generator app was used in two class meetings when students learned about short stories. The app was used in a computer laboratory, and the students were asked to work in groups. In using the app, the students were asked to fill out several prompts before the short story was generated. There were a number of prompts to complete, such as the opening, the conflict, the names of the protagonist and other characters, names of places, some nouns, adjectives, animals, and others. These prompts were then used in the story once it was generated. These apps, both the Elsa app and the Plot Generator app, were intended to assist the students in completing their assignments.

By employing a mixed method, a combination of quantitative and qualitative approaches (Creswell & Clark, 2018), this study used questionnaires and interviews as the instruments for data collection. The questionnaire used was the Situational Motivation Scale (SIMS) (Guay et al., 2000). This questionnaire uses 16 items with seven-point Likert scales to measure participants' intrinsic motivation, identified regulation, external regulation, and amotivation. Each motivation type is represented by four questionnaire items. The questionnaire was distributed online, and 133 students completed the questionnaire. Sixty-seven students were from the pronunciation classes, and 66 were from the writing classes. Initially, there were 85 students in the pronunciation classes and 80 students in the writing

classes. However, since the questionnaire was not made compulsory, not all students completed it.

For the qualitative data, this study used interviews. The interviews, in the form of semi-structured interviews, were intended to investigate more data regarding the students' motivation in learning with the AI app. Moreover, the interviews were also conducted online using an instant messaging app called WhatsApp. Interviews using instant messaging apps have been found to be flexible, efficient, and could provide richer data (Kauffmann & Peil, 2020). Thirteen students from the pronunciation classes and eight students from the writing classes participated in the interviews based on their questionnaire results. More students were invited, but as interviews were also not compulsory, not all students replied to the invitation.

The questionnaire data were used to find evidence of amotivation among the EFL students. The data was intended to provide the answer to the first research question regarding the evidence of amotivation using statistical analysis. Meanwhile, the interview data were used to investigate the amotivating factors in the second research question. These amotivating factors resulted from the thematic analysis of the interview data. In general, the themes were generated based on the internal and external factors affecting motivation. Internal factors came from the students, for example when they enjoyed learning with the app. Meanwhile, external factors came from the app, for example, the benefits the app offered for the students' learning.

FINDINGS

This section provides a comprehensive analysis of the data in an attempt to answer the research questions. The first research question will be based on the questionnaire data, and the second research question will be based on the interview data. The findings will be presented, and the analysis of the findings will also be discussed and interpreted.

Evidence of amotivation

The SIMS questionnaire (Guay et al., 2000) was used to find evidence of amotivation from the EFL students. In addition to amotivation (AM), the questionnaire was developed to also assess intrinsic motivation (IM), identified regulation (IR), and external regulation (ER). Intrinsic motivation and identified regulation are the more self-determined forms of motivation types, while external regulation and amotivation are considered as the less self-determined forms of motivation (Ryan & Deci, 2020). The means of the score of each motivation type of the 133 participants can be seen in Table 1.

Table 1
Means of Motivational Types

IM	IR	ER	AM
20.61	21.95	18.23	12.06

The table above shows that all types of motivation occurred in the students' learning with the AI apps. Although it is dominated by the more self-determined forms of motivation, external regulation, and amotivation also exist. Particularly for amotivation, the data indicates that it was also experienced by the students when learning with the AI apps in the classrooms. Although the score is low, it did occur. This finding provides the answer to research question no. 1: amotivation is evident among the EFL learners who participated in the AI-injected EFL classrooms. The number of students who experienced amotivation was quite significant, and it is described in Table 2.

Table 2
Distribution of AM Scores

Range of AM Scores	Number of Students	Percentage
4 ≤ 10 (1 st Quartile)	49	36.84%
10 ≤ 16 (2 nd Quartile)	49	36.84%
16 ≤ 22 (3 rd Quartile)	26	19.55%
22 ≤ 28 (4 th Quartile)	9	6.77%
Total	133	100.00%

There are four questionnaire items representing amotivation and using a seven-point Likert scale. Therefore, the amotivation (AM) score ranges from 4 to 28. To understand the significance of the amotivation data in this study, the AM scores are divided into quartiles. The range of each quartile has been provided in the first column of Table 2. From the table, it can be learned that there are more than 25% of the scores fall into the third and fourth quartiles. These students could be considered as those with high amotivation scores.

Table 3 consists of the students with high amotivation scores. There were 37 of them, and their AM scores were compared to the other types of motivation scores. Each student is represented by a code consisting of a letter and a number. The letter shows the class they enrolled for in this study, P for pronunciation class and W for writing class. Meanwhile, the number indicates the order the student completed the questionnaire compared to the other students. For example, Student P 15 means that the student is from the pronunciation class, and she was the 15th person to complete the questionnaire in her class.

Table 3
Students with high amotivation scores

Students	IM	IR	ER	AM
P-02	22	23	23	18
P-15	17	21	21	18
P-16	17	18	19	17
P-20	15	15	15	16
P-26	17	25	19	20
P-34	28	26	21	22
P-35	23	26	22	21
P-42	23	23	23	25
P-44	18	21	19	18
P-46	24	26	8	16
P-54	21	21	19	17
P-62	16	16	17	18
P-64	20	24	20	22
P-65	14	19	17	19
P-66	18	21	19	16
W-01	18	19	23	21
W-02	17	18	19	17
W-03	18	20	21	18
W-04	16	21	19	19
W-09	22	19	15	17
W-11	21	23	23	16
W-16	23	23	21	17
W-17	24	23	24	23
W-20	18	21	21	18
W-22	26	24	25	24
W-26	4	8	12	28
W-27	26	25	28	23
W-31	16	21	24	16
W-32	25	27	25	20
W-35	24	24	18	21
W-41	24	21	16	17
W-60	16	19	17	16
W-61	23	22	21	20
W-62	23	25	20	19
W-63	7	15	27	24
W-64	25	26	25	20
W-65	25	27	27	27

The table above consists of the data of the students with high amotivation scores, those whose scores are in the third and fourth quartiles, in comparison to other types of motivation. The other motivation types are intrinsic motivation (IM), identified regulation (IR), and external regulation (ER). Intrinsic motivation and identified regulation are considered the more self-determined forms of motivation, while external regulation and amotivation are the less self-determined types of motivation. The table also shows that there are some occurrences where students' higher scores on the less self-determined types of motivation are accompanied by lower scores on the more self-determined forms of motivation. This phenomenon is a normal situation, an expected logic. If students have higher scores in less self-determined forms of motivation, their scores on more self-determined types would be lower. Interestingly, there are occasions where both scores are high. It means that both more self-determined and less self-determined forms of motivation occurred at the relatively same levels. This, of course, requires further

investigation. For the context of this paper, however, the indication that amotivation is evident should be sufficient.

The distribution of the amotivation (AM) scores could be further visualised in a graphical form. Figure 2 serves this purpose by showing how each motivation type is distributed among the 133 participants. From the figure, it could also be seen that all motivation types existed when the students were working with the AI apps. This is in line with Luria (2022) who explains that students could experience more than one type of motivation when they are engaged in their learning activities.

The statistical analyses above confirm that amotivation is evident in this study. Along with the other motivation types, amotivation also occurred when students were using AI apps in their learning. In fact, the amotivation data is quite significant and worth further investigation. Although tiny, compared to the more self-determined forms of motivation, such as intrinsic motivation and identified regulation, it did exist. This finding, the existence of amotivation, signifies that some students experienced amotivation. In other words, not all students were motivated when working with AI apps. Similar findings have also been reported in previous studies (Gallacher et al., 2018; Graham, 2022; Robinson et al., 2019). Hence, a more comprehensive elaboration on the issue could provide a complete picture of students' motivation in AI-injected learning. The qualitative analyses of the interview data provide more information about this issue, particularly regarding the amotivating factors of AI-injected learning in this study.

Amotivating factors

A careful analysis of the interview data resulted in the answer to research question no. 2 regarding the amotivating factors. The participants' responses to the interview questions were categorised into several themes indicating the amotivating factors of the AI-injected learning observed in this study. The factors are intelligence, user interface, and lesson design. The findings and their examples will be discussed further on in the following paragraphs.

Intelligence

Intelligence is the core element of an AI app as the word also represents the main characteristic of the technology, artificial intelligence. In relation to that, this study has found that it is one of the factors that could dissuade EFL students from learning with AI apps. It happened when the students were frustrated with what the apps could not do, expecting that the app should have had the ability to do that. In the pronunciation class, for example, Student P-32 said, "The app could not recognise my pronunciation. I have tried it repeatedly, but the result was always the same." Student P-07 revealed a similar thing that on many occasions, she felt quite uncomfortable

because the app always said that her pronunciation was incorrect. The same cases occurred in the writing class where the Plot Generator app was considered unintelligent in producing short stories for the students. Student W-10, for example, admitted that the story produced was weird. Similarly, Student W-47 reported that she made a number of attempts, but the patterns of the story were just the same. The app might just change the words using the same template. These cases, both in the pronunciation and writing classes, where the apps are unintelligent in some events might contribute to the amotivation levels of the students.

User interface

This is another factor found to be one of the amotivating factors of the AI-injected learning in this study. The user interface is about how the user interacts with the app. Apparently, some students had some disappointing experiences when working with the apps. For example, in the pronunciation class, Student P-50 admitted that sometimes she was confused about how to use the app, primarily when she used the app for the first time. She did not know what to do next after completing a task. This might happen because she was not yet familiar with the app or there was not enough guidance on how to use the app. Student I-32 said that the app was boring, particularly in cases when she could not continue her learning with the app because some activities were for premium users only. She even proposed a suggestion for this issue, "what if the premium activities are substituted with points the user could collect through playing some games, for example. This would make the app more interesting." Therefore, instead of paying with money, users can get the premium features by paying with points they collect to complete other activities, like games. A similar case was reported from the writing class regarding the fact that the app was not ready for mobile phones. Student W-16 complained about the issue, saying, "The app can only be used using a computer, and I don't have a computer." Student W-62 elaborated that it was difficult to use the app using mobile phones since the layout was designed for something other than mobile phones. With these examples, this study suggests that how the students interacted with the app could also affect their motivation in using the app. When the interface is not user-friendly, students might be reluctant to continue to use the app.

Lesson design

Unlike the other two factors, this is external to the AI apps. While the intelligence and user interface factors are directly associated with the apps, lesson design is about how the teachers design the learning activities for the students to use the AI apps. Interestingly, this could also bring negative impacts on the students' motivation. In the pronunciation

class, for example, the students were asked to use the Elsa app outside class for the whole semester. It was not part of the regular class meetings as it was considered a complementary activity in addition to the main lessons in the classroom. Moreover, the use of this app was optional, since the students could use it or not, or use another AI app they found more suitable for them. Apparently, this approach did not work for all students as many students only used it for about a month, stopped using it, or changed to another app. Student P-32 was one of them, "I used it for more than a month then switched to another app." Student P-62 also revealed that she only used it at the beginning of the semester. In the writing class, the plot generator app was used only in two meetings where the students used it to help them write short stories. In the classroom, the students were asked to work in groups to develop their short stories with the app. It turned out that not all students were comfortable with this approach. Student W-18, for example, said that the use of the Plot Generator app in a writing class was not suitable for group work. Student W-59 was even against the use of the app, reporting that, "I actually don't really like the use of this plot generator since we are limited to the ideas generated by the app." As the stories were generated by the app, some students thought that they could not develop their own ideas in completing the activities. These examples could serve as proof of how the teachers utilise an AI app in their classrooms might also affect students' motivation in learning with the app. With a suitable lesson design, an AI app could further help the students in their learning.

This finding regarding the factors affecting amotivation indicates that both the app characteristics and the teacher's utilisation of the app are instrumental in determining students' motivation. The characteristics of the app, in terms of its intelligence and user interface, could bring negative impacts on students' motivation when students have negative experiences in using the app. Similarly, regarding lesson design, how the teacher utilises the app in the classroom could also harm students' motivation when it does not effectively contribute to students' learning. Although both factors could also boost motivation, in certain circumstances they could do otherwise (Sumakul, 2023).

DISCUSSION

This study has found that amotivation is evident in AI-injected learning in EFL contexts. Although the statistical data shows that the more self-determined forms of motivation are dominant, there are indications of the less self-determined forms of motivation, including amotivation. It serves as the answer to research question no. 1 regarding the evidence of amotivation.

The fact that EFL students might develop different types of motivation was also reported in other studies (e.g., Lamb & Arisandy, 2020; Wichadee & Pattanapichet, 2018). In such cases, all forms of motivation could be experienced by the students. However, when external regulation and amotivation are more common, the general students' motivation is positioned towards the less self-determined end of the continuum. Meanwhile, when intrinsic motivation and identified regulation are more common, the general students' motivation is positioned towards the more self-determined end of the continuum.

This study has found that, in general, the students' motivation when working with AI apps was the more self-determined form of motivation. However, the less self-determined forms of motivation, including amotivation, still existed. This finding confirms that amotivation was evident among the EFL students who participated in this study. It means that there are areas in AI-injected learning that could be improved. These apply to the design of the app regarding its intelligence and user interface and the design of the lesson when the teachers integrate the app into their teaching. In other words, app design and lesson design are two important aspects of students' motivation in AI-injected learning.

After finding that amotivation was evident in AI-injected learning in the EFL classrooms observed in this study, the next research question was to investigate the factors causing the amotivation or the amotivating factors. Based on the interview data, this study has also found that there were some factors of AI-injected learning that could bring negative impacts on students' motivation. They are intelligence, user interface, and lesson design.

As AI is imitating human intelligence (Russel & Norvig, 2016), the AI apps used in this study, in the context of language learning, were either performing language teachers (Matthews, 1993) or language students' intelligence (Lu, 2018). The Elsa app, for example, could act like a language teacher when it could analyse and, at the same time, assess the pronunciation of the students. The Plot Generator could create short stories, simulating the intelligence of a language student.

The simulations of human intelligence, however, may indicate some flaws as pointed out in this study. For example, this study revealed that the Elsa app failed to recognise students' pronunciation as reported by some students. The Plot Generator app was also reported to produce weird stories, indicating that this intelligent app was not really intelligent. However, as AI technologies are still developing, the human intelligence performed by the AI apps is not yet perfect. There were events when the apps would create errors, and this would bring frustration to some students. Similar cases

were reported by other studies about intelligent apps being unintelligent (e.g., Fibriana et al., 2021; Gallacher et al., 2018; Pace-Sigge & Sumakul, 2022; Wilson et al., 2021). This study found that when AI apps perform actions that could not be considered intelligent, the condition might deter the students from learning with the apps.

Another factor found in this study that could affect students' motivation is the user interface. In software engineering, this could also be described under the term usability covering the effectiveness, efficiency, and satisfaction aspects (Jordan, 2002). A more straightforward explanation could be about how useful, easy, and satisfactory the app is to the users. These three aspects of usability show how it could be related to motivation from the perspective of Self Determination Theory (SDT). As identified regulation could be associated with the values perceived and intrinsic motivation could be connected to enjoyment in SDT (Deci & Ryan, 1985), the feelings the students experience while interacting with the AI apps could also affect their motivation. When the students cannot see the values of the AI apps in their learning nor enjoy their learning activities with the AI apps, amotivation could occur.

The third amotivating factor is lesson design. As discussed before, this is external to the AI apps and more related to how the teachers utilised the AI apps in the learning activities for their students. Whether the app is to be used individually or in groups, inside or outside the class regular meetings, or with a computer or a mobile phone are some considerations teachers usually have in designing the lesson. These decisions are crucial since they could directly affect the students, including their motivation. Sumakul (2019) suggests that teachers should develop analytical, creative, and evaluation (ACE) skills when using technology in their teaching. Similarly, Newton and Newton (2019) propose a code of practice when teachers use AI in their classrooms. These are related to their pedagogical competence in technology-based pedagogy (Mishra & Koehler, 2006). Especially in AI, as AI-injected learning is still a relatively new concept, and only little is known about the topic, one of the issues here is that there is still a weak connection between the practice and the theoretical perspectives underlying the practice (Zawack-Richter, 2019). Sumakul, et al. (2022a) thought that it could also lie in the fact that teachers are still lacking in pedagogical competence. In terms of lesson design in AI-injected learning contexts, teachers' pedagogical competence is an issue that could directly or indirectly affect students' motivation.

In general, this study found that the intelligence and user interface of an AI app and the lesson design of the teacher could contribute to students' motivation. In a more general context,

when students find that the AI app they are working with is not as intelligent as expected, they could be reluctant to continue using the app. Similarly, when the students have uncomfortable experiences when working with the app, their motivation to learn with the app could also decline. Moreover, this amotivating event could also happen when the way the teacher utilises the app does not fit well with the students' learning.

CONCLUSION

Participated by 133 EFL students from a university in Indonesia, this study aimed at investigating the amotivation experienced by the students in AI-injected learning contexts. With a mix-method approach, this study employed questionnaires (Guat et al., 2000) and interviews (Kauffmann & Peil, 2020) to provide the answers to the research questions. The research questions were regarding the evidence of amotivation in the students' learning and the factors that could contribute to the amotivation experienced by the students.

The results of the study show that amotivation is evident in AI-injected learning among the EFL students participating in this study. Moreover, the factors that are responsible for the amotivation experienced by the students have also been highlighted. They are intelligence, user interface, and lesson design. Intelligence and user interface are internal to the AI apps, while lesson design is associated with the teachers' pedagogical competence when utilising the AI apps for their students' learning.

One important issue that emerged from this study is teachers' pedagogical competence. This was revealed when this study found that lesson design was a contributing factor to students' motivation. In technology-based education, AI in particular, teachers' knowledge of the material and the technology should always be associated with sound pedagogical competence. As the use of AI in language classrooms will be more prevalent in the future, research on teachers' pedagogical competence in AI-injected learning needs to be explored more. Once this issue has been better understood, the use of AI technology in language classrooms would bring more benefits to the students.

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