The Antecedents of Mobile-Assisted Language Learning Applications Continuance Intention

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Abstract: The purpose of the research is to analyze the factors that influence the continuance intention to use Mobile-Assisted Language Learning (MALL) applications in the context of language courses in Indonesia. The study aims to understand the key factors that contribute to users' intention to continue using MALL applications, particularly in the context of the COVID-19 pandemic and the shift towards online and remote language learning. The research used the expectation-confirmation model and self-determination theory. Moreover, the research utilized a mixed-methods approach to achieve its objectives. A quantitative approach was employed, involving a survey with 445 respondents who had experience using MALL applications. The survey data was then analyzed using covariance-based structural equation modeling. Additionally, qualitative research was conducted through interviews with 17 respondents to gain a deeper understanding of rejected hypotheses and gather qualitative insights. The most important results of the research include identifying the factors that influence the continuance intention to use MALL applications. The study found that users' perceived usefulness of the application, their satisfaction with its usage, and their self-regulation ability significantly influence their intention to continue using MALL. These findings highlight the importance of these factors in shaping users' decision to persist with MALL applications for language learning. By understanding the factors that influence users' intention to continue using MALL, educational institutions and application providers can improve their offerings and tailor them to meet the needs and expectations of learners. This research advances the e-learning area by shedding light on the factors that influence the continuance intention to use MALL applications. By uncovering the importance of perceived usefulness, satisfaction, and self-regulation ability, the study contributes to the understanding of user behavior and decision-making in the context of e-learning. The findings can inform the design and implementation of MALL applications, leading to more engaging and effective language learning experiences in online and remote settings. This research contributes to the advancement of e-learning practices by providing evidence-based insights into the factors that drive user intention and adoption of technology in language learning.

Keywords: Mobile assisted language learning, Expectation-confirmation model, Self-regulation skills, Self-determination theory, Continue intention to use, Indonesia

1. Introduction

Since the COVID-19 pandemic, informal learning mode, such as foreign language learning, has been carried out online. Mobile-Assisted Language Learning (MALL) is defined as language learning carried out through mobile technology. The primary key components of MALL are flexibility in learning time and location, continuity of learning on different devices, easy accessibility of information, and adaptability to learning habits (Loewen et al., 2019). Examples of popular MALL applications are Duolingo, Busuu, Babbel, Rosetta Stone, Memrise, and others. Users-wise, by the end of 2020, Duolingo had reached 42 million users, an increase of 40% from the previous year, which touched 30 million users (Business of Apps, 2022). However, the overall retention of language learning applications is lower than in other categories, such as books, casual gaming, and news (Business of Apps, 2020). BBC (2020) described that one of the biggest challenges for users to learn a new language is motivation and self-control. In addition, retention is closely related to individual goals and expectations (BBC, 2020).

Using MALL, some features allow users to easily access learning resources without time or place restrictions (Chung, Hwang, Lai, 2019; Hamidi & Chavoshi, 2018). Implementing this kind of education technology may lead to psychological comfort learning (Al-Otaibi, AlAmer, Al-Khalifa, 2016). In several previous studies, there are also findings that the use of MALL can add benefits to several skills lines, such as vocabulary, reading skills, writing skills, listening skills, and pronunciation skills (Hao et al., 2019; Lin, 2014; Hwang et al., 2014; Hwang & Chen, 2013; Shih, Lee, Cheng, 2015; Loewen et al. 2019).

The use of MALL also has several limitations, such as user devices that are not certainly capable, thus affecting the quality of functionality and connectivity of learning services by MALL (Sarrab, Elbasir, Alnaeli, 2016; Ünal & Güngör, 2021). In addition, there are pedagogical limitations, such as the flow of the learning process that has not adapted to the way students learn independently (Cheon et al., 2012; Ünal & Güngör, 2021). Psychologically, the pedagogical limitation of using MALL is the continuity or persistence of users who have not been good

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(Loewen et al., 2019). Because, in the context of MALL, the persistence of MALL users is as important as the technological advances used (Loewen et al. 2019). Persistence in this context is how the user's perception and behavior remain good in the activity, even though it is faced with some distractions and difficulties (Wolters, 2004). This problem can be seen in the Duolingo application where the user's course completion rate is below 1%. (Duolingo – Golden Owl Hall of Fame, 2020). Course completion rate is a number obtained from the comparison of the number of users who take and complete the course with the total number of users who take the course (Duolingo – Golden Owl Hall of Fame, 2020). The definition of "completion" refers to completion of the overall course structure (Duolingo – Golden Owl Hall of Fame, 2020). In Duolingo, the highest course completion rate was obtained from the Ukrainian language program with 0.23% and Danish with 0.22%. (Duolingo – Golden Owl Hall of Fame, 2020). As a comparison, this number is still quite far when compared to the course completion rate in the Computer Assisted Language Learning with an open course format, which has a number of 2.9% to 4.4% (Friðriksdóttir & Arnbjörnsdóttir, 2015).

To the best of our knowledge, not many studies specifically discuss MALL, more discussing aspects of learning activities (Wang et al., 2022; Lai et al., 2022). In fact, according to Statista (2022) and Business of Apps (2022), the use of MALL has had high growth in the last few years. Further, there has been no research involving self-determination theory as an influencing factor of users' satisfaction along with their motivation (Wang et al., 2022; Lai et al., 2021; Wang & Lin, 2022), and self-regulation factors from individuals as external factors (Wang et al. et al., 2021; Wang & Lin, 2022). Thus, this study will analyse the factors that influence the continuance use of MALL. This study will adopt the expectation-confirmation model (ECM) and self-determination theory (SDT). This research can be resourceful for mobile language learning application developers and other actors in the field of language education in developing their applications.

2. Literature Review

2.1 Expectation Confirmation Model

ECM is widely used to study Information System continuance intention (Li & Fang, 2019; Wang & Lin, 2022). The ECM is widely used for several field studies, such as mobile learning (Wang & Lin, 2022), MALL (Ünal & Güngör, 2021), massive open online courses (Daneji, Ayub, Khambari, 2019; Dai et al., 2020), and online learning (Clow, 2013; Wang et al., 2022). ECM is used to study user's satisfaction and behavior in the post-information system use (Bhattacherjee, 2001). ECM believes several aspects are closely related to the continuance use of users, such as the degree of confirmation, the degree of perceived usefulness, and the degree of user satisfaction (Bhattacherjee, 2001; Li & Fang, 2019; Wang & Lin, 2022). Previous studies showed the usage of ECM and concluded that confirmation as an exogenous variable has significantly influenced the level of user satisfaction and perceived usefulness (Li & Fang, 2019; Wang & Lin, 2022). Furthermore, user satisfaction and perceived usefulness in application usage can affect the continuance use intention of application users (Bhattacherjee, 2001; Li & Fang, 2019; Wang & Lin, 2022).

2.2 Self-Determination Theory

SDT is a theory that discusses motivation and human well-being, which has the main objective of explaining how and why there can be an ongoing motivation and behavior that occurs (Ryan & Deci, 2017; McEown & Oga-Baldwin, 2019). SDT is associated closely with basic psychological needs as their component (Ryan & Deci, 2017). Basic psychological needs refer to human psychological needs that influence human self-development as an individual with their external world and the inner world, crucially (Ryan & Deci, 2011). Specifically, it covers three aspects, autonomy, competence, and relatedness (Ryan & Deci, 2017). Autonomy is an individual's need to experience independently and take actions that are carried out voluntarily (Ryan & Deci, 2017). Autonomous behavior is reflected through volunteerism or support from within and an interest that drives the behavior (Ryan & Lynch, 1989; Ryan & Deci, 2017). The second aspect is competence, the need for an individual to feel the mastery of skills and carry out activities effectively (Ryan & Deci, 2017). The need for competence is closely related to perceived effort, curiosity, and one's epistemic motivation (Ryan & Deci, 2017). The third aspect is relatedness, which covers the need for an individual to be interrelated and have a sense of ownership (Ryan & Deci, 2017). This type of fulfillment is perceived when a person feels they could perform the contribution exchange with another party (Ryan & Deci, 2017).

2.3 Research Hypothesis

We modified the ECM and SDT as our proposed conceptual model. ECM has also been used in several studies related to the use of applications for learning contexts, such as the research of Luo, Lin, Yang (2021), Ünal dan Güngör (2021), and Wang and Lin (2021). ECM is used in this study to analyze the factors that influence MALL

continuance intention while SDT is used to determine the factors that influence motivation and satisfaction with MALL. Perceived autonomy, perceived competence, and perceived relatedness are the components of basic psychological needs to represent SDT (Ryan & Deci, 2017). Those variables are used to see the learning application from the user's inner side. Self-regulation skills or perceived behavioral control were involved in this study because it has been used in the research of Lai et al. (2021), Ünal & Güngör (2021), Lung-Guang (2019), and Li (2019). These factors describe the ability of users to control their actions (Lai et al., 2021; Ünal & Güngör, 2021; Lung-Guang, 2019; Li, 2019) and are used to represent the consistency and persistence of users in carrying out learning actions (Lai et al. al., 2021; Ünal & Güngör, 2021; Lung-Guang, 2019; Li, 2019). Therefore, this research model has nine variables and 14 potential causal relationships (hypotheses) (Figure 1). The preparation of hypotheses is carried out by referring to studies related to learning applications. This study uses the two-tail hypothesis because not many studies have investigated MALL to the best of our knowledge; thus, we could not define the directional research hypothesis (one-tail).

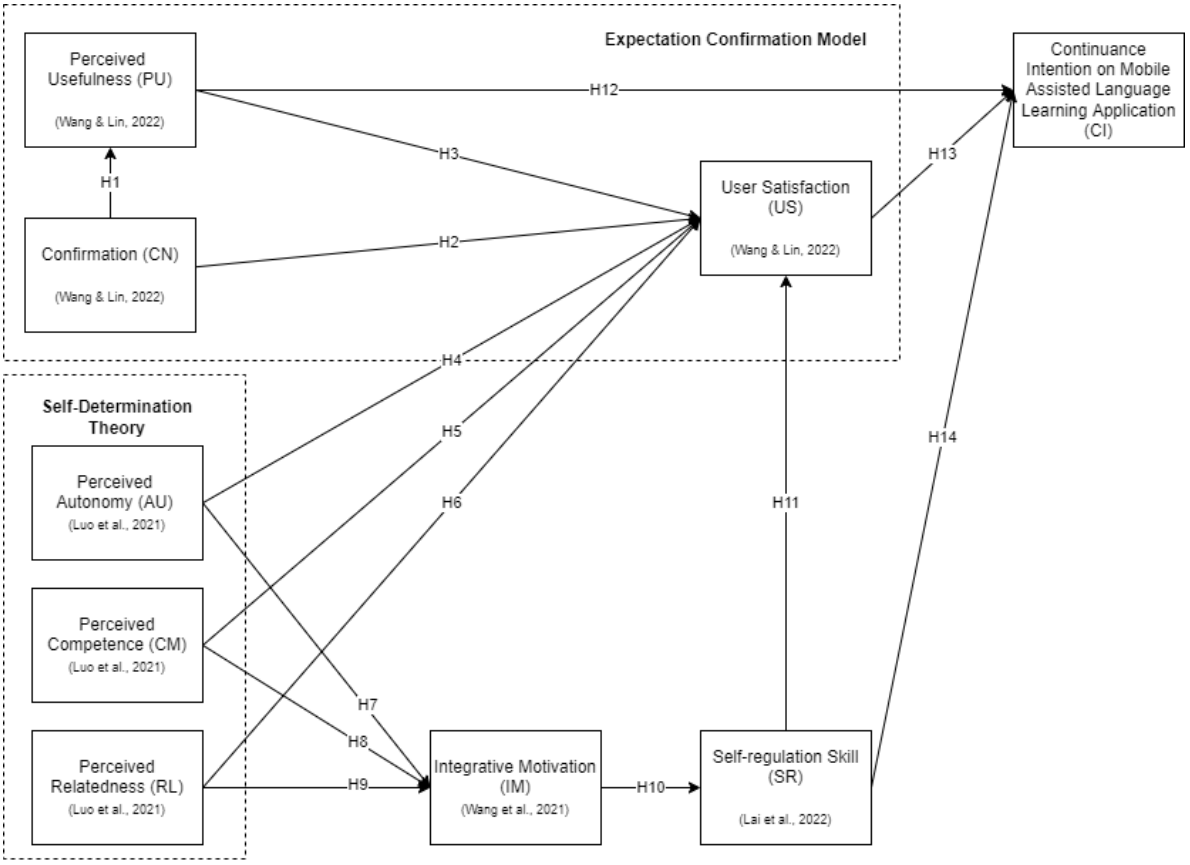

Figure 1: Proposed Conceptual Model

Confirmation is the level of user confirmation of their expectations (Bhattacherjee, 2001). In this study, confirmation is defined as the degree of user awareness regarding fulfilling the expectation in using MALL. Perceived usefulness in the Bhattacherjee model (2001) is defined as the users' perceived value or usefulness degree. Perceived usefulness is defined in this study as the degree of user confidence that MALL can improve their learning performance. Wang and Lin (2021) found that confirmation from users can affect the level of perceived usefulness of users. Their study found that users who realize the achievement of expectations using the application feel that the application will be helpful for the user. Similar results were shown in several previous studies with various contexts, such as massive open online course applications (Luo, Lin, Yang, 2021; Dai et al., 2020) and Duolingo applications (Ünal & Güngör, 2021). Thus, we propose the following hypothesis:

H1: Confirmation influences perceived usefulness on the use of MALL.

Wang and Lin (2021) and Ünal and Güngör (2021) mention an association between confirmation and user satisfaction. Both studies found that users' awareness of applications' expectations met influenced the satisfaction tendency with the applications used. Other studies on applying for massive open online courses

(Luo, Lin, Yang, 2021; Dai et al., 2020) have confirmed this relationship. Therefore, we suggest the following hypothesis:

H2: Confirmation influences user satisfaction on the use of MALL.

Wang and Lin (2021) mention a relationship between perceived usefulness and user satisfaction. Wang and Lin (2021) also found that users who feel the application's usefulness tend to be satisfied with the application used. Similar findings were also shown in several previous studies with various contexts, such as massive open online course applications (Luo, Lin, Yang, 2021; Dai et al., 2020) and Duolingo applications (Ünal & Güngör, 2021). Hence, we develop the following hypothesis:

H3: Perceived usefulness influences user satisfaction on the use of MALL.

Several previous studies found that each component of these basic psychological needs may influence user satisfaction, one of which is the autonomy component. Research conducted by Abuhassna et al. (2021) in the context of e-learning and Abuhassna et al. (2020) in the context of massive open online courses shows that the flexibility of learning activities can affect user satisfaction in using the learning application. In addition, the study of Akbari, Pilot and Simons (2015), in the context of language learning through social media, Facebook, suggests that if users feel freedom and unimpeded during the learning process, especially in exploring new information or knowledge, user satisfaction in learning with the media will surely increase or reached. Then, we propose the following hypothesis:

H4: Perceived autonomy influences user satisfaction on the use of MALL.

In a study conducted by Akbari, Pilot and Simons (2015), in the context of language learning through social media, Facebook suggests that the competence felt by students can increase user satisfaction in learning to use the media. The growth of competence felt by students while learning to use the media can create a sense of satisfaction in users (Akbari, Pilot, Simons, 2015). The sense of satisfaction felt by users is obtained because users are happy to receive feedback from the learning (Akbari, Pilot, Simons, 2015). This finding is also in line with Tseng et al. (2022) who stated that the awareness about the growth of proficiency and perceived usefulness made users feel satisfied with the online learning platform.

H5: Perceived competence influences user satisfaction on the use of MALL.

Research conducted by Abuhassna et al. (2021) in the context of e-learning and Abuhassna et al. (2020) in the context of massive open online courses indicates that users' sense of connection with the learning platform may affect user satisfaction in their application usage. Research by Akbari, Pilot and Simons (2015) within the context of language learning through Facebook also suggests that users who feel connected to learning media, especially in exploring new information or knowledge, will increase user satisfaction in learning through the media. Therefore, we suggest the following hypothesis:

H6: Perceived relatedness influences user satisfaction on the use of MALL.

Luo, Lin and Yang (2021) show that there is a wide range of applications for learning that users feel can increase student motivation intrinsically. With the freedom to learn, users are increasingly motivated to use the application because it can give the impression of better learning opportunities. These findings are also in line with research conducted by Aditia, Dahlan and Ilfiandra (2021) in the context of the online learning environment and Holzer et al. (2021) regarding online and self-regulated learning. Then, we define the following hypothesis:

H7: Perceived autonomy influences integrative motivation on the use of MALL.

Furthermore, Luo, Lin and Yang (2021), in the context of the massive open online course application, show a perceived competency growth as the result of learning activities through the application may grow students' intrinsic motivation. The growth of competence motivates users to learn because applications provide user needs or the user's way of learning properly (Luo, Lin, Yang, 2021). Research conducted by Aditia, Dahlan and Ilfiandra (2021) in the context of an online learning environment and Holzer et al. (2021) regarding online and self-regulated learning also showed the same results. Thus, we suggest the following hypothesis:

H8: Perceived competence influences integrative motivation on the use of MALL.

Luo, Lin and Yang (2021) prove that the user's sense of attachment to the application can increase student motivation intrinsically. This sense of attachment shows in the application's forms that can understand the user's input. In addition, a sense of attachment is also shown by the sense that the application can contribute to users,

and users can contribute to the application. The results of this study are also in line with Aditia, Dahlan and Ilfiandra (2021) and Holzer et al. (2021). Based on this analysis, this study added the following hypothesis:

H9: Perceived relatedness influences integrative motivation on the use of MALL.

Bai and Wang (2021), in high school students in Hong Kong, stated that there is motivation in the form of a growth mindset, and learning interest may influence the independent learning process, especially in the initiative, managing feedback received, and revising knowledge aspects. In addition, the motivation of students' mindsets to develop is one of the predictors of self-control in independent learning activities. In addition, Alotumi (2021) states that students who have intrinsic interests tend to be more enthusiastic and actively participate in learning activities. In addition, Tabak and Nguyen (2013) suggest that intrinsic motivation can indirectly affect self-control and tend to have more attention on the learning that is carried out. Then, we added the following hypothesis:

H10: Integrative motivation influences self-regulation skill in the use of MALL.

Self-regulation ability is one of the most influential factors in independent learning activities outside technology (Lung-Guang, 2019). Self-regulation skill is an individual's ability to consciously exercise complete control over an action so that it can take place consistently (Zimmerman & Schunk, 2011). In this study, the self-regulation skill variable is defined as the user's ability to control their actions on something entirely so that it is always consistent and persistent. Li (2019) found that one's self-regulation ability when using massive open online courses influences user satisfaction in learning activities. In addition, Mirhosseini, Lavasani and Hejazi (2018) also show that the self-regulation ability of students can increase their satisfaction with learning activities and their self-efficacy. The justification for these results is that students whose self-regulation abilities will generally focus on strategies for how applications are utilized according to their needs (Mirhosseini, Lavasani, Hejazi, 2018; Li, 2019). Using the perceived strategy, students feel a good satisfaction degree while using the application (Mirhosseini, Lavasani, Hejazi, 2018; Li, 2019). Both studies are also in line with the findings obtained by Hamdan et al. (2021). Hence, we propose the following hypothesis:

H11: Self-regulation skill influences user satisfaction on the use of MALL.

Perceived usefulness in Bhattacherjee (2001) is defined as the usefulness that is believed to be achieved by the user. In the context of this study, the perceived usefulness variable represents the degree of user confidence that MALL can improve their learning performance. Continuance intention from Bhattacharjee (2001) is defined as the user's intention to keep choosing or using something. In the context of this study, continuance intention is defined as the user's intention to continue using the MALL application. The relationship between the two variables is supported by Wang and Lin (2021), with the context of using mobile learning applications. Similar results were also evident in several previous studies with various contexts, such as the massive open online course application (Luo, Lin, Yang, 2021; Dai et al., 2020; Joo et al., 2018) and the Duolingo mobile language learning application (Ünal & Güngör, 2021). Thus, we define the following hypothesis:

H12: Perceived usefulness influences continuance intention on the use of MALL.

User satisfaction variable from Bhattacherjee (2001) is known as the level of user satisfaction that is known to come from interactions with related matters. This study defines user satisfaction as the degree of user satisfaction with MALL based on direct experience. Continuance intention from Bhattacharjee (2001) is defined as the user's intention to keep choosing or using something. In the context of this study, continuance intention is defined as the user's intention to continue using MALL. The use of these two variables is supported by research by Wang and Lin (2021), with the context of using mobile learning applications. Similar results were also evident in several previous studies with various contexts, such as the massive open online course application (Luo, Lin, Yang, 2021; Dai et al., 2020; Joo et al., 2018) and the mobile language learning application Duolingo (Ünal & Güngör, 2021). Therefore, we suggest the following hypothesis:

H13: User satisfaction influences continuance intention on the use of MALL.

Self-regulation skill is an individual's ability to consciously perform complete control over an action so that it can take place consistently (Zimmerman & Schunk, 2011). The relationship between self-regulation skills and continuance intention is supported by Ünal and Güngör (2021) and Lung-Guang (2019). In addition, Lai et al. (2021) state that self-regulation ability affects a person's actual behavior in learning activities. We added the following hypothesis:

H14: Self-regulation skill influences continuance intention on the use of MALL.

3. Methodology

3.1 Data Collection

The object of this research is a mobile language learning application found on the Play Store or App Store for the Indonesian area. This research was conducted with a mixed-method approach, using online questionnaires and interviews with respondents who have used the MALL application at least once. Online interviews were conducted to confirm the rejected hypothesis. After compiling the online questionnaire, we conducted a readability test to ensure that the questionnaire could be understood well. The readability test was carried out for seven days, from January 26, 2022, to February 1, 2022. The readability test was carried out on nine respondents using Zoom. The output of this readability test is an improvement in grammar and wording so that it is easier for respondents to understand. After the readability test, a pilot study was conducted on 30 respondents to test the validity of the questionnaire. The result shows the Cronbach Alpha (CA) value of 0.784, which has met the requirements for a CA value above 0.7.

Online questionnaire link was distributed through social media, such as Twitter, Instagram, and instant messaging applications like LINE and Whatsapp. In the research questionnaire, respondents also filled out their consent to be willing and agreed to participate in this study, and data was obtained anonymously. We also provide incentives in the form of IDR500,000 electronic money for some lucky respondents. The online questionnaire data collection was carried out for four weeks, starting from February 10, 2022, to March 12, 2022, and obtained as many as 445 respondents. Table 1 explains the demographic summary of the respondents.

Table 1: Respondents' Demographics

Demographics		Number of Respondents	Percentage
Gender	Men	189	42.47%
	Women	256	57.53%
Age	< 17 years old	16	3.60%
	17 - 25 years old	388	87.19%
	26 - 35 years old	34	7.64%
	36 - 45 years old	5	1.12%
	> 45 years old	2	0.45%
Domicile	Greater Jakarta	234	52.58%
	Outside Greater Jakarta in Java Island	161	36.18%
	Sumatera	25	5.62%
	Bali, NTB, and NTT	12	2.70%
	Kalimantan	6	1.35%
	Sulawesi	5	1.12%
	Others	2	0.90%

Then, after testing the hypothesis, it was found that some hypothesis was rejected. To explore the reasons why the hypothesis in this study was rejected, we conducted online interviews via online video conference with seventeen respondents.

3.2 Data Analysis

The data were processed using the IBM SPSS AMOS 24 application with the Covariance Based Structural Equation Modelling (CB-SEM) method. This CB-SEM approach is used, considering that the objective of CB-SEM is to test previously developed theories. The main stages in CB-SEM include testing measurement models, structural models, and hypotheses. Interview data were processed using the content analysis method without specific software tools. The online interview was recorded, and the interview transcript was made. Based on the transcripts, writing results were conducted to explain the reasons for rejecting any hypothesis.

3.3 Research Instrument

This research questionnaire was made using Indonesian in accordance with the respondents' nationality. The research questionnaire consists of three main parts: the first part provides the validation part, the second part is questions related to demographics, and the third part contains statements related to the research model and variables. In the first part, one question confirms whether the respondent has ever used a mobile language learning application. The first part is intended so only valid respondents can answer the follow-up questions in the next part. In the second part are questions related to the demographics of the respondents and the respondents' use of MALL. The third part consists of 36 measurement items that are mandatory questions. The answer to the measurement items is in the form of the respondent's level of agreement with the question, which is answered through a 5-point Likert Scale, that ranges from 1 (strongly disagree) to 5 (strongly agree). Appendix A describes the measurement items used in this study.

4. Results

4.1 Measurement Model

The following requirement for convergent validity is the average variance extracted, or AVE, which represents the convergence of indicators (Hair et al., 2013). For the AVE value, each indicator has a number above or equal to 0.5 (Hair et al., 2013). In addition, the reliability scale constraint should be achieved by looking at the construct reliability scores or CR and CA (Hair et al., 2013). The general rule for good CR and CA values is at least 0.7 (Hair et al., 2013). Values for AVE, CA, and CR for all variables are listed in Table 2.

Table 2: CR, CA, and AVE Values

Variable	CA	CR	AVE
PU	0.787	0.789	0.556
CN	0.775	0.991	0.975
US	0.773	0.991	0.972
CI	0.781	0.993	0.978
SR	0.706	0.993	0.978
IM	0.755	0.991	0.973
AU	0.738	0.990	0.972
RL	0.748	0.991	0.973
CM	0.702	0.990	0.971

Note: PU = perceived usefulness; CN = confirmation; US = user satisfaction; CI = continuance intention; SR = self-regulation skill; IM = integrative motivation; AU = perceived autonomy; RL = perceived relatedness; CM = perceived competence

4.2 Structural Model

The goodness-of-fit (GoF) test on the structural model is performed by checking numerous value criteria, such as chi-square fit statistics/degree of freedom (CMIN/df), goodness-of-fit index (GFI), root means square residual (RMR), normed fit index (NFI), comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error

of approximation (RMSEA). Table 3 explains the GoF value where all the GoF criteria have met the requirements of Hair et al. (2013).

Table 3: GoF Values

No.	Criteria	Cut-off Value	Value	Description
1	CMIN/df	< 2	1.998	Good fit
2	GFI	>= 0.9	0.919	Good fit
3	RMR	<= 0.05	0.042	Good fit
4	NFI	>= 0.09	0.916	Good fit
5	CFI	>= 0.09	0.955	Good fit
6	TLI	>= 0.09	0.941	Good fit
7	RMSEA	<= 0.08	0.049	Good fit

4.3 Hypothesis Testing

Hypothesis testing is carried out to see the relationship between variables based on the structural research model (Kline, 2015). This test is conducted by calculating the P-value or probability. With these conditions, the hypotheses are accepted if the P-value does not exceed 0.05 (Hair et al., 2013). This research was performed through a two-tailed direction, with a significance level of 95%. Based on these provisions, 13 hypotheses can be accepted, and 1 hypothesis cannot be accepted (Table 4).

Table 4: Hypothesis Testing Result

Hypothesis				Estimate	P	Description
H1	PU	<---	CN	1.178	0.002	Accepted
H2	US	<---	CN	0.169	0.002	Accepted
H3	US	<---	PU	0.097	0.001	Accepted
H4	US	<---	AU	0.154	0.002	Accepted
H5	US	<---	CM	0.196	0.002	Accepted
H6	US	<---	RL	0.195	0.002	Accepted
H7	IM	<---	AU	0.250	0.002	Accepted
H8	IM	<---	CM	0.348	0.003	Accepted
H9	IM	<---	RL	0.197	0.002	Accepted
H10	SR	<---	IM	0.746	0.003	Accepted
H11	US	<---	SR	0.066	0.070	Rejected
H12	CI	<---	PU	0.725	0.003	Accepted
H13	CI	<---	US	0.115	0.002	Accepted
H14	CI	<---	SR	0.076	0.002	Accepted

5. Discussion

This study shows that confirmation can affect perceived usefulness in the use of MALL (H1). The findings of these results are in line with those of Wang and Lin (2021), Luo, Lin, Yang (2021), and Dai et al. (2021). This study found that MALL can exceed user expectations, so users will feel that the application provides benefits for them to learn. Confirmation points in the context of this research include meeting expectations on several indicators, such as features in general, the learning process offered, the assessment system applied, and the quality of

application use in general. Based on the demographic data of the questionnaire, as many as 74.38% of respondents often use the learning module feature, 62.92% of respondents often use the checkpoint quiz feature, and 56.40% of respondents often use the learning progress feature. In addition, this study shows that the more MALL exceeds user expectations, the more satisfied users will be with MALL (H2). The results of this study are in line with Wang and Lin (2021), Luo, Lin, and Yang (2021), and Dai et al. (2020). The results of this hypothesis are also supported by the results of interviews with two respondents *("… exceeded my expectations, which at first, I thought it would be very serious…"* – Respondent 1).

This study also shows that perceived usefulness can affect user satisfaction in the use of MALL (H3). The results of this study are in line with Wang and Lin (2021), Luo, Lin and Yang (2021), and Dai et al. (2020). The results of this hypothesis are also supported by the results of qualitative interviews where users feel satisfaction in MALL (*"… gives a lot of knowledge and is quite useful too…"* – Respondent 10; *"… because it is useful, I can learn new vocabulary…"* – Respondent 16). Furthermore, this study shows that perceived autonomy affects user satisfaction with MALL (H4). The results of H4 are supported by Abuhassna et al. (2021) and Abuhassna et al. (2020). Abuhassna et al. (2021) show that a good online learning platform must support the autonomous activities of students as it can affect students' flexibility in learning. In other words, an online learning platform that supports independent learning for students will provide satisfaction for its users because it provides the value of flexibility without having to study in a formal classroom setting or class via conference. One of the perceived freedoms is that the learning platform can be used exploratory in a module and facilitates repetition of learning on the desired material (Abuhassna et al., 2020). In addition, Akbari, Pilot and Simons (2015) suggest that if users feel the freedom to learn, especially in exploring new information, user satisfaction with learning to use the media will increase. The H5 is accepted in this study which defines that the user's perceived competence can affect user satisfaction with the use of MALL and is following Akbari, Pilot and Simons (2015). The results of H5 are also supported by qualitative interviews where users feel a sense of satisfaction in using it because it can improve the vocabulary competence of the user (*"… giving knowledge such as new vocabulary that I may not have known or never heard of…"* – Respondent 3; *"… I think the application is insightful and gives much new vocabulary …"* – Respondent 4). This study shows that the user's perceived relatedness can affect user satisfaction with the use of MALL (H6). The results of this study are in line with Akbari, Pilot and Simons (2015), Abuhassna et al. (2021), and Abuhassna et al. (2020). Based on the results of interviews, it was found that users felt a sense of satisfaction in using MALL because the application was reliable or minimal to errors (*"… the application is quite dependable, does not always crash …"* – Respondent 5).

Then, the user's perceived autonomy can affect the user's intrinsic motivation in using MALL in this study (H7). The results of this hypothesis are supported by Luo, Lin and Yang (2021), Aditia, Dahlan and Ilfiandra (2021), and Holzer et al. (2021). Those studies mention that freedom or flexibility of learning in several forms of implementation, such as re-learning, or material exploration, can stimulate student motivation (Aditia, Dahlan, Ilfiandra, 2021; Holzer et al., 2021). Based on the questionnaire results, as many as 74.38% of respondents use the learning module feature for learning exploration, and as many as 59.55% of respondents use the challenge feature as a form of additional exploration and self-actualization in the learning process. In addition, it is also known that as many as 48.0% of respondents expect a dictionary feature in the application, which can add to the exploratory nature. The use of the features mentioned earlier and the demand for the dictionary feature indicate user needs regarding features that facilitate users to freely learn and carry out their self-actualization during the learning process. In other words, the user's integrative motivation in using MALL will be greatly influenced by the fulfilment of the need for flexibility in learning, application responsiveness, and self-actualization during the learning process by the application in question. In addition, the user's perceived competence can affect the user's intrinsic motivation to use MALL (H8). The findings of this study are also quite in line with Aditia, Dahlan and Ilfiandra (2021) and Holzer et al. (2021). Both state that if students feel an increase in knowledge or knowledge or competence through activity, they will tend to increase their intrinsic motivation again. (Aditia, Dahlan, Ilfiandra, 2021; Holzer et al., 2021). Competence growth makes users feel motivated to learn because applications are judged according to user needs (Luo, Lin, Yang, 2021). Based on questionnaire data, as many as 74.38% of respondents often use the learning module feature, and 24.94% use the flashcard feature. In addition, as many as 38.43% of respondents use the script learning feature according to the needs of the language they are learning. Additionally, 62.92% of respondents generally use the checkpoint quiz feature to test their knowledge. These features indicate that users are using features that are expected to provide competency growth and confirm their ability to increase. In other words, the user's integrative motivation in using MALL will be strongly influenced by the development of the user's perceived competence, which includes increased knowledge, increased ability, increased confidence in abilities, and optimization of learning performance. The user's perceived relatedness can also affect the user's intrinsic motivation to use MALL (H9).

The results of H9 are supported by Luo, Lin and Yang (2021), who also prove that the user's sense of attachment to the application can increase student motivation intrinsically (Luo, Lin, Yang, 2021). Based on questionnaire data, 56.40% of respondents use and are aware of the learning progress feature, and 38.88% use the goal-setting feature to help them learn. In addition, as many as 41.80% of respondents also take advantage of the learning reminder feature as a form of their strategy or study plan.

This study shows that the more the application can make users feel motivated, the more users will have good self-control during application use and tend to be consistent and proactive (H10). This study's findings align with Bai and Wang (2021). The student's developing mindset becomes one of the predictors of self-control in independent learning activities (Bai & Wang, 2021). In addition, Alotumi (2021) states that students who have intrinsic interests tend to be more enthusiastic and actively participate in learning activities. Based on questionnaire data, as many as 86.07% use applications with the motivation to develop themselves, and as many as 37.08% use applications because of the respondent's desire to explore knowledge.

This study shows that H11 is rejected where the user's ability to exercise self-control while using the application does not affect their satisfaction. The results of H11 contradict Li (2019). Based on the results of interviews, users feel that their learning strategies or persistence of learning have no effect on their satisfaction but rather provide awareness about the functions or features of the application (*"… Does not make using the application more satisfied but becomes more aware of the application function ..."* – Respondent 15). In addition, respondents also felt that self-regulation skills did not affect their satisfaction with using the application. However, they became more aware of how to use it, and this has implications for adopting applications as a place to learn (*"… I do not think strategy affects satisfaction, but I think I understand more about the application…"* – Respondent 5). In addition, respondents also thought that the presence or absence of a strategy for using the application should not affect satisfaction because satisfaction should be obtained from the quality of the application and good experience with the application (*"… no, because the satisfaction felt is usually from the feeling when using the app…"* – Respondent 12)

This study shows that users' perceived usefulness can lead to the intention to use MALL (H12). The results of this study are in line with Wang and Lin (2021), Luo, Lin and Yang (2021), and Dai et al. (2020). The results of this hypothesis are also supported by the qualitative interviews conducted. From the interview results, it is known that users have the intention to use the application because, overall, the application is quite helpful for users (*"… I use the application continuously because I felt the application was useful for me ..."* – Respondent 5). In addition, several respondents specifically mentioned that users use MALL continuously because it is beneficial for their vocabulary learning (*"… secondly, because the application is useful for increasing vocabulary …"* – Respondent 16). Respondents also feel that the application can be a suitable means to facilitate respondents to learn (*"… The factor is because the application can facilitate me to learn. Because I have the urgency to learn and the application facilitates my urgency, so I will also continue to use the application …"* – Respondent 11).

In addition, this study shows that users who are satisfied with MALL will continue to use the application (H13). These results are in line with Luo, Lin and Yang (2021), Dai et al. (2021), and Wang and Lin (2021). This result is also supported by interviews where users are satisfied with the experience of MALL, which is easy to use *("… Because the application is easy to use and not difficult to use …"* – Respondent 4). In addition, the aspect of satisfaction is also felt thanks to the structure and approach to learning at MALL, which is quite good (*"… The factor that makes me want to use it offers quite good benefits, with a smooth approach …"* – Respondent 9; *"… I keep using the application because the application is quite fun, it feels like playing a game, and the learning mode is not too hard …"* – Respondent 14).

Finally, self-regulation skill influences continuance intention on the use of MALL. The findings of this study are supported by Lung-Guang (2019) and Lai et al. (2021). The results of this hypothesis are also supported by interview data where it is known that respondents who feel the need or urgency to learn have a continuous intention to use MALL (*"… I use this application because I feel it is necessary for my learning needs. In terms of my urgency, I continue to use the application …"* – Respondent 2). In addition, respondents who use MALL as the only strategy for learning have a continuous intention to use the application (*"… Third, I think this application is my only option to learn languages specifically, so because I have an urgency to study. So, I keep using it that way…"* – Respondent 5; *"… Second, because I do not have additional course lesson. So, I use this application as an option for studying…"* – Respondent 15).

6. Implications

In general, this study contributes to the research suggestions by Lai et al. (2022) by carrying out one application of mobile technology specifically for independent research related to language learning. This study answers these suggestions by researching one of the applications of MALL. This research is also one of the contributions to McEown and Oga-Baldwin (2019), where this study suggests applying the basic human psychological needs variable for research in education or language acquisition. The results of this study indicate that every aspect of basic human psychological needs, namely the need for freedom of learning, the need for competency development, and the need for feeling attached during learning, can influence the degree of satisfaction and integrative motivation of users to learn using MALL.

Moreover, the interaction between the three ECM variables, namely confirmation, perceived usefulness, and user satisfaction can be applied to course institution and MALL developers by implementing a learning curriculum that is in accordance with the user's initial use objectives, so that users feel the relevance of the application to user's benefits. For course institutions who decide to design MALL, they can consider creating a self-assessment tool or a student-centered learning application. By integrating language course learning with the MALL application, students can practice more so that they can further improve communication skills in learning foreign languages.

Furthermore, in developing the MALL, course institution or MALL developers need to pay attention to aspects of autonomy, competency growth, and a sense of connection that users will have to increase their perceived satisfaction. One example of a feature that can increase the aspect of autonomy is the dictionary feature and the discussion forum feature for sharing study tips. Both features can increase the aspect of autonomy felt by the user through the exploratory sense offered by the existence of these features. In addition, the discussion forum feature can trigger a sense of attachment for users, not only with the application itself but also with other users. With this, users can feel a good connection and are expected to have better motivation and satisfaction. In addition to these two features, the grammar feature can also increase user satisfaction by triggering the user's perceived competence.

7. Conclusion

This study shows that the factors that influence the continuance use of MALL are perceived usefulness, user satisfaction, and self-regulation skills. In this study, it was also found that the confirmation factor influenced the perceived usefulness. Another finding of this study is that integrative motivation factors influence self-regulation skills. Moreover, integrative motivation factors are influenced by perceived autonomy, competence, and relatedness. The first limitation is that most respondents currently reside in the Greater Jakarta area, and the age group is 17 to 25. In addition, the distribution of applications used by respondents is still the majority using the Duolingo application, where more than 90% of respondents are respondents who have used the Duolingo application. Future research can examine other factors that may affect the continuance intention variable from MALL because this study's coefficient of determination shows a moderate value.

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Appendix A: Questionnaire

Part 1: User's Validation

Have you ever used the MALL app to learn a foreign language? Yes/No (If no, the user can not proceed to fulfil the questionnaire)

Part 2: User's Demographics

Select only one answer for each following question:

Gender : a. Men b. Women

Age : a. < 17 years old b. 17 - 25 years old c. 26 - 35 years old d. 36 - 45 years old e. > 45 years old

Domicile: a. Greater Jakarta b. Outside Greater Jakarta in Java Island c. Sumatera d. Bali, NTB, and NTT

e. Kalimantan f. Sulawesi g. Others

Part 3: Measurement Items

Answer using 5-point Likert Scale, that ranges from 1 (strongly disagree); 2 (disagree); 3 (neutral); 4 (agree) to 5 (strongly agree)

Code	References	Measurement Items
CN1	Wang and Lin (2021)	I feel the features of the MALL are better than I expected.
CN2		I feel that the learning process using the MALL is better than I expected.
CN3		I feel that the feedback or assessment system in the MALL is better than I expected.
CN4		Overall, I feel that the quality of using the MALL is better than I expected.
PU1		With MALL, I feel I can improve my performance in learning languages.
PU2		With the MALL, I feel I can improve my skills in foreign languages.
PU3		I feel that MALL can effectively help me learn a foreign language.
PU4		I feel learning languages through MALL will be useful for me.
US1		I feel happy with language learning activities on MALL.
US2		I feel that my experience in language learning on MALL is quite good.
US3		I am satisfied with language learning with MALL.
US4		I feel that my needs in language learning can be met through a MALL.
AU1	Luo et al. (2021)	I feel free to learn and respond to MALL.
AU2		I use the MALL to study because of my own will.
AU3	Xi and Hamari (2019)	I feel that I can be myself during the learning process with the MALL.
AU4		Overall, I feel that I can use MALL for independent learning.
CM1	Luo et al. (2021).	I feel I have better foreign language skills because of the use of MALL.
CM2		I am satisfied with my learning performance when using MALL.
CM3	Xi and Hamari (2019)	By learning through the MALL, I feel more confident in the foreign language skills I am learning.
CM4		I feel that the MALL gives me the new knowledge that I need.

Code	References	Measurement Items
RL1	Luo et al. (2021)	When using a MALL, I feel that the application is reliable for my learning process.
RL2		When using a MALL, I feel that the application is reliable for my learning process.
RL3	Xi and Hamari (2019)	When using MALL, I feel that I have to study regularly to progress further.
RL4		When using a MALL, I feel that the application understands the input I give.
IM1	Luo et al. (2021)	I agree that the use of MALL can be used according to my needs.
IM2		I agree that MALL are a good way or approach to learning for me.
IM3		I agree that the use of MALL gives me freedom in learning.
IM4		I agree that the use of MALL meets my needs in using these applications.
SR1	Lai et al. (2022)	I re-evaluate my understanding of learning activities in MALL.
SR2		I try to be consistent in using MALL in language learning.
SR3		I'm trying to find a supporting solution if I feel that the learning activities on the MALL are not enough for me.
SR4		I can strategize for language learning with efficient and effective using MALL.
CI1	Wang and Lin (2021)	I intend to use MALL in the future.
CI2		I intend to continue to use the MALL on a regular basis.
CI3		I intend to utilize MALL for some other purposes.
CI4		If possible, I will continue to use MALL to learn other languages.