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An Experiment on Mobile Learning to Leverage EFL Learners' Engagement, Emotional Intelligence, and Learning Motivation

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Research has acknowledged Mobile-assisted language learning (MALL) as one efficacious method for leveraging language proficiency across skills and components, leaving the investigation on language learners' motivation and emotional intelligence of peripheral focus, albeit being essential drives for academic success. This study seeks to fill the gaping void by investigating the impact of team-based mobile learning (TBML) as an instructional framework to leverage EFL learners' online learning engagement (OLE), trait emotional intelligence (TEI), and EFL learning motivation. This instructional framework involves a mobile instant messenger (MIM), Telegram, to support collaborative learning both within and beyond class hours. Employing a quasi-experimental approach, the study involved 475 undergraduate students at an Indonesian state university across majors, including nursing, management, science education, and non-formal education, with ages ranging from 18 to 22 years. The findings corroborate significant increment in the abovementioned dimensions resulting from TBML, as opposed to the unworthy increase associated with computer-based LMS. Moderate positive correlations also exist among three pertinent variables. Implications suggest how TBML accords English learners with the authentic learning community armed with myriads discourse resources to empower their multidimensional engagement in meaningful literacy practices.

Keywords: EFL learning motivation, MIM, online learning engagement, TBML, TEI

Introduction

Advancement in mobile technology, including fast connection, powerful operating systems, and massive storage, has proliferated authentic, participative mobile language learning (Kim & Kim, 2020) and transformed pedagogical delivery (Rambe & Bere, 2013). Mobile learning aptly fits today's English

learners in higher education as they appreciate mobile technology with unlimited opportunities for collaboration (Annamalai, 2019) and stronger authenticity and ownership to retrofit their learning endeavors (Schuck et al., 2016). Current discussions elucidate ubiquitous and seamless collaborative mobile learning contributing to increased motivation, engagement, mutual support, and positive affectivity (Kukulska-Hulme & Viberg, 2017), stemming from the perceived usefulness and playfulness of mobile technology (Huang et al., 2019).

For mobile learning not to be mired in past ways of pedagogical delivery, learners need to be encouraged to gain the utmost of abundant resources in border-crossing contexts to regulate their learning endeavors toward their needs (Zou & Yan, 2014). This is also essential to avoid low motivation, negative attitude to mobile learning, and disrupted concentration (Elaish et al., 2017; Sung et al., 2015). Therefore, language instructors need to leverage students' mentality to engage in mobile learning by designing strategies through which they can accomplish learning tasks and appropriate myriads learning resources (Kukulska-Hulme & Lee, 2020)

Engaged in mobile learning, students experience diverse emotional, psychological and behavioral dynamics, which affect the willingness and regulation of their language learning (Dixson, 2010; Taheri et al., 2019). This acknowledges that academic success does not solely depend on cognitive skills (Aliakbari & Abol-nejadian, 2015). Teachers need to understand these dynamics and develop more advanced skills to appropriate mobile technologies for empowering learning experience (Diao & Hedberg, 2020). This direction of pedagogical inquiry becomes even more prominent in consideration that positive links exist between emotional intelligence, learning motivation, and student engagement (Pavelescu, 2019; Shao et al., 2013; Sung, 2015; Zhoc et al., 2018).

This study addresses two gapping voids germane to emotional intelligence and mobile pedagogical framework to increase emotional intelligence, EFL learning motivation, and online learning engagement. Although emotional intelligence currently enjoys its prominence in education in general and ELT in particular, current discussions have only tapped upon the teaching praxis in face-to-face teaching (see Shao, 2013; Shao et al., 2013; Taheri et al., 2019 for example). Likewise, recent works regarding mobile learning have yet to probe into emotional intelligence and EFL learning motivation (see Afful & Akrong, 2019; Andujar & Salaberri-Ramiro, 2019; Rambe & Bere, 2013; Rambe & Mkono, 2019 for example). In coherence, studies delving into pedagogical structure to leverage emotional intelligence remain a paucity (Shao et al., 2013). Methodologically, research on emotional intelligence and motivation only applies qualitative research to investigate the association between EFL learners' emotional intelligence and motivation (see Pavelescu, 2019). No study has been underway to scrutinize the direct link between the two and, more importantly, how each is co-affected by mobile learning. To address the gaps, this study probes into the impacts of team-based mobile learning (TBML) to propel emotional intelligence, EFL learning motivation, and online learning engagement, with further orientation to discover the association between these variables.

Due to the large-scale nature of this study, only congruent constructs with quantitative properties were put under investigation. We embraced the notion of trait emotional intelligence (TEI) proposed by Petrides and Furnham (2001), who define it as self-perceived abilities and behavioral dispositions measured through self-assessment. Following Xuejun (2020), EFL learning motivation is defined as the motivational drive for learning English within EFL setting. This construct involves amotivation as the perceived failure to link between actions and possible results in learning English, which is more common among EFL learners. Dixson's (2010) model of online learning engagement was operative in this study. The construct portrays students' participation, performance, emotional appeal, and skills deployed to excel in online learning. The following research questions guide the study:

1. Does the use of TBML significantly improve Indonesian EFL learners' EFL learning motivation?
2. Does the use of TBML significantly improve Indonesian EFL learners' online learning engagement?
3. Does the use of TBML significantly improve Indonesian EFL learners' trait emotional intelligence?

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4. Is there any significant association between Indonesian EFL learners' profiles of online learning engagement, emotional intelligence, and EFL learning motivation?

Theoretical Frameworks and Research Hypotheses

MIM for English Learning

The fundamental for embracing MIM in language learning is its congruence with contemporary life and usefulness for instruction-oriented purposes (Rambe & Bere, 2013; Rambe & Mkono, 2019). Educators acknowledge MIM's superiority to create dialogic environment for students' active collaboration, which gainfully transforms teaching and learning (Cremades et al., 2019; Rambe & Bere, 2013). This is characterized by the voluntary departure from formal linguistic features due to the medium transferring texts across registers and the supra-segmental affordances of emoticons and emojis. Likewise, mobile social networking site (SNS), such as WhatsApp, has been found to outperform common SNS, such as Facebook, with regard to increased language learning motivation and engagement (Andujar & Salaberri-Ramiro, 2019; Çetinkaya & Sütçü, 2018).

With hybrid communicative affordances of MIM, teachers and students are liberated to retrofit language learning in an environment supportive to foreign language acquisition (Lai, 2016). Andujar (2016) points out how MIM enhances language acquisition through its affordances encompassing: (1) asynchronous and synchronous interaction, (2) effortless access to learning content and real-time information regarding online users, (3) diverse chat features such as repair moves, negotiation of meaning, confirmation checks and comprehensions, self-repetition and clarification requests, and (4) more flexibility in sharing such media as texts, images, voices, and videos. MIM-aided mediation accrues an inviting environment fostering students' active engagement, positive attitude to learning, and stronger sense of belonging to a learning community (Kukulska-Hulme & Lee, 2020). With these affordances, MIM further empowers learner autonomy through a wide range of mediations and supports to propel cognitive and linguistic processing in a meaningful authentic environment (Lin et al., 2019).

A Sociocultural Framework to Mobile Language Learning

The abovementioned affordances are acknowledged to be an apt fit with active collaborative language learning bound to sociocultural theory to learning (Andujar, 2016; Çetinkaya & Sütçü, 2018; Elaish et al., 2017). This is because sociocultural learning values student-centric pedagogy to enact social interaction as both source and drive for learning (Wang, 2007). Community of language learning in sociocultural context powered by mobile learning experiences improves language acquisition as manifested in linguistic gains (Lin et al., 2019). MIM nurtures language acquisition through the enactment of social relation, cultural practices, and ambient relationship among learners of different proficiency levels.

The present study follows Ma's (2017) study which explicates sociocultural framework for mobile learning. This framework emphasizes three fundamental factors to L2 acquisition, encompassing psychological factors (cognitive and linguistic activities as the precursor to language learning), physical factors (mobile device and mobile apps to mediate language learning), and other agents (teachers and peers). The framework operationalizes L2 agency, mobile technology, and other agents, respectively. L2 agency highlights common cognitive processing upon which learners draw their language learning. These involve metacognition, cognition, entertainment, communication, and self-regulation. In addition, the presence of other agents in mobile language learning resonate the essential of sociocultural nature of human activities armed with inexhaustible online resources to mediate learning (Kukulska-Hulme & Viberg, 2017).

Team-based Mobile Learning via MIM

The framework guiding the present study is adapted from Zhu and Wang (2019). They propose four components pivotal to collaborative mobile learning: a) readiness empowerment b) permanent team formation, c) application activity, and d) peer assessment. Driven by application activity, the framework has robust alignment with socioconstructivist approach to language learning embedded in project-based language learning. Following Alfassi (2009) and Ke (2010), this study argues that TBML is coherent with project-based learning in dialogic environment in that both appreciate holistic students-centric learning which draws upon suitable authentic resources, students-led metacognitive practices, and integrated literacies.

MIM serves as social and cultural artifact to grant the impetus for language learning by stimulating multitudes cognitive and metacognitive processing within communicative setting (Resnik & Schallmoser, 2019). To that end, MIM serves as the catalyst for linguistic and cognitive undertaking. As a corollary, it results in the co-construction and negotiation of meaning among peers (Kukulska-Hulme & Viberg, 2017; Rambe & Bere, 2013). In congruence, the creation of smaller group chat rooms allows more self-expressions and self-disclosure through which student can freely vent their hardships and resultant cognitive, motivational, and emotional dynamics (Rambe & Mkono, 2019). Hereunder is the model of Telegram-aided TBML adapted in the present study.

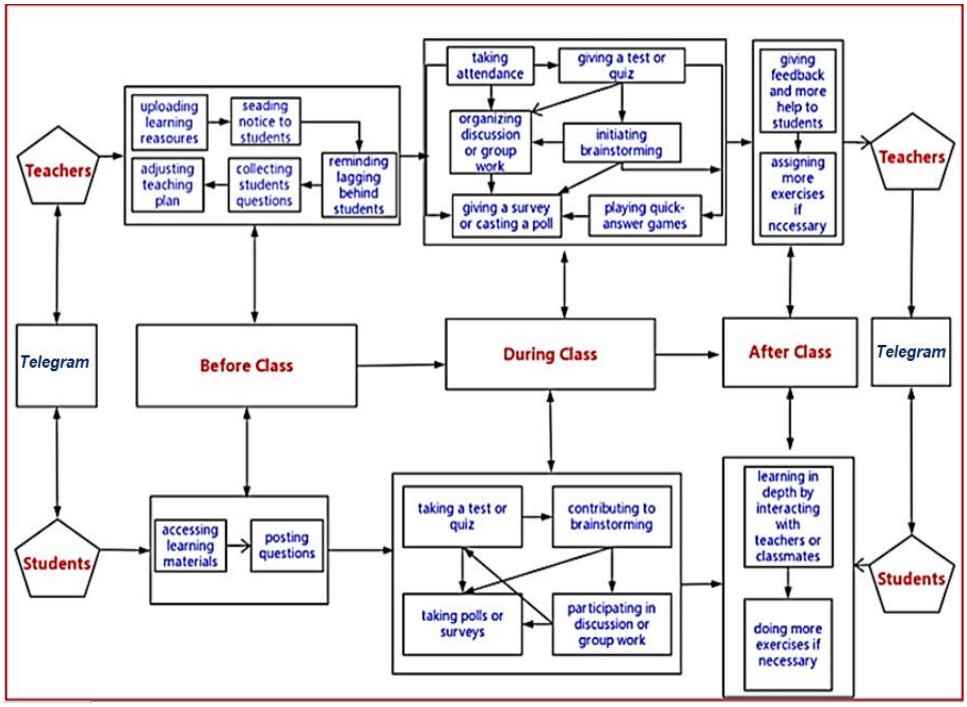

Figure 1. Learning activities in Telegram-aided TBML.

The Current Portraits of EFL Learners' Learning Engagement, Motivation, and Emotional Intelligence in Online Setting

This study aims to shed lights on EFL learners' engagement, motivation, and emotional intelligence when engaged in collaborative mobile learning. In so doing, it paves the investigation in three ways. First, it attempts to understand multidimensional constructs driving EFL learners' engagement stemming from collaborative mobile setting. Albeit gaining its traction in language pedagogy (Cremades et al., 2019), MIM has yet to be deeply investigated for its collaborative properties. Current discussions are in fact

occupied with the inquiries of how MIM impacts language performance without specific framework of students-centric learning (see Annamalai, 2019; Chang & Lin, 2019; Hwang et al., 2014; Yavuz, 2016 for example). In addition, research on the engagement in collaborative mobile learning is still dominated by qualitative investigation (Annamalai, 2019; Tragant et al., 2020), therefore lacking psychometric measures on learners' engagement. Two exceptions are study by Hu et al. (2019) and Huang et al. (2019), which garners findings on the perceived motives and outlook on the integration of mobile technology. However, these do not specifically investigate the possible increment of online learning engagement in linkage to collaborative mobile setting.

Second, as different learning experiences trigger distinctive emotional outcomes and coping strategies (Shahivand & Moradkhani, 2020), this study lends itself to addressing the void on the emotionality of collaborative mobile learning. Emotional intelligence is widely acknowledged to affect the magnitude and direction of language learning, yet previous works on mobile learning have not delved into that (see Afful & Akrong, 2019; Andujar & Salaberri-Ramiro, 2019; Çetinkaya & Sütçü, 2018; Cremades et al., 2019 for example). The existing literatures only address learners' emotional intelligence in face-to-face teaching (see Shao et al., 2013; Taheri et al., 2019 for example). Considering the conundrum of low motivation, negative attitude, and disrupted focus in online language learning (Elaish et al., 2017; Sung et al., 2015), the scrutiny on engagement-emotion reciprocity holds the potential in better understanding pedagogical interventions driving positive emotionality in online setting (Zhou, 2016). This aspiration also applies to the investigation on the motivational dynamics in EFL learning.

EFL milieu poses acute motivational dynamics as learners may not see direct relevance of learning the language in their context (Xuejun, 2020). Fine-tuning language instruction to this dynamics becomes more essential since learners have higher expectation on motivational teaching practice than the high regard which teacher attributes to their teaching practice (Truong, 2021). Following Karapanos et al. (2016), this expectation resonates the demand to understand the motivational and psychological bearings to mobile learning. Previous works have in fact tapped upon mobile language learning and reported enhanced learning motivation (Huang et al., 2019; Tragant et al., 2020). Notwithstanding, similar inquiry geared to collaborative mobile learning remains scarce, which aids in tackling low motivation and demotivation within EFL setting (Elaish et al., 2017; Kim, 2017). One exception is recent work by Alamer and Al Khateeb (2021), which acknowledges the connection between WhatsApp-mediated learning and autonomous motivation. Another work, albeit pertinent to motivation, has only addressed intrinsic motivation (Li et al., 2019), therefore overlooking the entirety of motivational dynamics.

The gaps abovementioned lend themselves to actuating the aspiration to optimize MIM to instigate and sustain language learners' self-regulated learning (Sha et al., 2012). As such, this investigation holds the value of gainfully bridging current theories and practices in collaborative mobile learning. To that end, this study formulates the following hypotheses:

1. TBML can significantly increase EFL learners' online learning engagement at $p < 0.05$. This attends to previous works on collaborative mobile learning which has been found to increase students' participation (Huang et al., 2019; Rambe & Bere, 2013).
2. TBML can significantly increase learners' TEI at $p < 0.05$. Due to the absence of studies investigating the impact of collaborative mobile learning on TEI, the hypothesis is substantiated by studies in relative isolation. Team-based learning helps to increase university students' emotional intelligence (Borges et al., 2012). This is coherent with study on collaborative literary works evinced to enhance EFL learners' emotional intelligence (Abdolrezapour & Tavakoli, 2011). The most distant related literature is the experimental study on mobile flipped-classroom found to raise emotional learning (Wang et al., 2020).
3. TBML can significantly increase EFL learners' learning motivation at $p < 0.05$. Mobile collaborative learning increases language learners' motivation, enjoyment, and collective encouragement, while concomitantly lowering negative affectivity (Alfassi, 2009; Kukulska-Hulme & Viberg, 2017; Shahivand & Moradkhani, 2020).

4. The study extrapolates significant positive association between TEI, EFL learning motivation, and online learning engagement. This hypothesis is proposed in consideration of research by Taheri et al. (2019) affirming positive association between EFL learners' emotional intelligence, cognitive intelligence, and learning styles. This resonates research which documents strong association between emotional intelligence, engagement, and self-regulation (Zhoc et al., 2018).

Research Method

To scrutinize the impacts of TBML on the aforementioned traits along with their correlation within large-scale research, the study applied quasi-experimental research involving pre-test and post-test design.

Setting and Participants

The present study was carried out in a compulsory course on English for Academic Purpose (EAP) at an Indonesian state university. These courses were conducted online due to pandemic and mediated by both computer and mobile technologies for sixteen meetings, in four-month period. With random sampling, the research recruited 475 first-year students from both science and social science disciplines. These involved nursing, management, science education, and social science education. Their age ranged from 18 to 21 years old. The students were assumedly at B1 in CEFR scale, which was the pre-requisite to the course enrollment. Consents from the participants were obtained before research commencement.

Instructional Procedure: Differentiating Experimental and Control Groups

Twelve classes were randomly assigned to experimental group (N = 237 students) and control group (N = 238 students), resulting in six classes in each group involving both science and social science majors. Levene's test for equality of variances was operationalized prior to treatment, with the following hypotheses:

H1: Control group and experimental groups have significantly different average scores in TEI, online learning engagement, and EFL learning motivation
H0: Control group and experimental groups do not have significantly different average scores in TEI, online learning engagement, and EFL learning motivation

Rejecting *H1*, the test results evinced that both groups were homogenous with regard to TEI, online learning engagement, and EFL learning motivation, as signified by *t*-scores ($p > 0.05$) of 0.256, 0.610, and 0.346, respectively. All students in both groups had personal smartphones with active internet connection and Telegram installed as the main communication platform endorsed by the university.

The learning activities in both groups were generally characterized by grammar exercises, discussion, project-based tasks, shared reading and listening, collaborative writing, and peer-feedbacks. The control group was taught using the university learning management system (LMS) powered by Moodle™ and video conferencing tool, ZOOM™. Video conference took most proportion of class hours, followed with individual and group assignment mediated by the LMS, to which the students submitted their learning products, such as pictures, audio recordings, and text-based documents. To contrast, those in experimental group were randomly assigned to small chat groups consisting of four to six students. This moderate team size aimed to encourage intensive exchanges and enjoyable chatting among members (Lai, 2016). The teacher always used English when communicating in group chats, while students were liberated to opt for Indonesian or English. The video conferencing was employed briefly prior to setting TBML tasks during and after class hours. LMS was operative to aid task submission and recording students' attendance. Upon task accomplishment, the students used Telegram to share the tasks and manage group discussion, with

teacher being in the peripherality of discussion. They shared their ideas, learning resources, and interim products with their peers in the chat room, followed by continuous reflection and revision on the learning artifacts. The teacher took more active role at this phase to give constructive feedbacks and formative assessment.

Data Collection

Three distinctive batteries were operationalized in the present study. The original items were first translated to *Bahasa Indonesia* to ensure accurate understanding. This translated instrument was shared between the authors to check the item clarity. This instrument was trialed in a pilot test involving 82 freshmen from non-English study program to check its clarity, internal consistency and validity by administering reliability test and 2-tailed Pearson Product Moment test. No revision was made on the wording of survey items since the statistical tests demonstrated fine internal validity and consistency, as reported below.

TEI measure

TEI measures individual's behavioral tendencies and self-assessed abilities through self-report. The construct encompasses interpersonal trait (e.g., "*I like helping people")*, intrapersonal trait (e.g., "*Looking at both my good and bad points, I feel good about myself")*, adaptability (e.g., "*It's easy for me to adjust to new conditions")*, stress management (e.g., "*I can handle stress without getting too nervous")*, and general mood (e.g., "*I generally hope for the best")* (Petrides & Furnham, 2001). The trial results of 15 translated items demonstrated α 0.890 and satisfactory internal validity ($p < .05$).

EFL learning motivation

Xuejun (2020) argues that for EFL setting learners may not have the integrative motivation to use the target language in respective community, which highlights the need for more appropriate measure. The instrument taps on intrinsic motivation (e.g., "*I am studying English because I think it is good for my personal development"*), extrinsic motivation (e.g., "*I am studying English because I have to meet the requirements/expectations of my teachers and/or parents"*), and amotivation (e.g., "*I don't know why I am studying English, and frankly, I don't care").* The trial results of 20 translated items corroborated exemplary internal validity ($p < .05$) and $\alpha = 0.854$.

Online learning engagement

This instrument follows Student Course Engagement Questionnaire (SCEQ). The domains under scrutiny are pertinent to skills engagement (staying up on readings, putting forth effort, e.g., "*I study through Telegram discussion on a regular basis"*); emotional engagement (making the course interesting, applying it to personal life, e.g., "*I really desire to learn the course material and exercise through Telegram discussion"*); participation/interaction engagement (having fun, participating actively in small group discussions, e.g., "*I help fellow students in Telegram discussion and exercises"*); and performance engagement (doing well on tests, getting a good grade, e.g., "*I get a good grade on the exercises in Telegram discussion"*) (Dixson, 2010). The translated version reached α 0.927, with all 20 translated items having satisfactory internal validity ($p < .05$).

Data Analysis

To answer the first three research questions, the present study employed paired sample tests with the aid of SPSS 26.0. Pearson Product Moment was at play upon investigating the association between TEI, EFL learning motivation, and OLE.

Findings

RQ 1: TBML Significantly Improves Indonesian EFL Learners' Learning Motivation

The first analysis coped with the EFL learning motivation between pre-test and post-test within groups. Paired sample test discovered no noteworthy differences between both test scores with respect to the overall average in each domain as shown in Table 1.

TABLE 1
Group EFL Learning Motivation by Paired Sample Tests

Pairwise Comparison	Pre-test score	Post-test score	*SD*	*SE*	*df*	*p*
Experimental Group						
Extrinsic motivation	3.6015	3.6926	1.03857	.06746	236	.196
Intrinsic motivation	4.0480	4.1355	.87423	.05679	236	.056
Amotivation	1.5021	1.5485	1.06617	.06926	236	.503
Control Group						
Extrinsic motivation	3.9402	3.9823	.04507	-1.285	237	.200
Intrinsic motivation	4.0578	4.1423	.06587	-.767	237	.444
Amotivation	1.6695	1.6751	.16667	-.064	237	.949

Another paired sample test probed into all individual items corresponding to three motivational dimensions in experimental group only. The findings in Table 2 mark several significant increments germane to both extrinsic motivation (items 1, 2, and 3) and intrinsic motivation (items 4 and 5).

TABLE 2
Significant Increase by Paired Sample Tests

Pairwise Comparison	Pre-test score	Post-test score	*SD*	*SE*	*df*	*p*
Experimental Group						
1) I am studying English in order to get a good job in the future.	3.7257	4.0000	1.66109	1.66109	236	.012
2) I am studying English in order to get a good mark.	3.4599	3.7215	.10790	.10790	236	.018
3) I am studying English because I would feel guilty if I don't know English	4.2278	4.4135	-.48683	-.48683	236	.033
4) I am studying English for the pleasure that I experience in knowing more about the culture of the English-speaking Countries.	3.8650	4.0549	1.68465	1.68465	236	.032
5) I am studying English because I enjoy the feeling of acquiring knowledge about the English-speaking countries and their people's way of life	3.6160	3.8143	.10943	.10943	236	.045

*$p < .05$

TBML creates an inviting environment which garners students' engagement and stimulates the increment of their extrinsic motivation. Zhu and Wang (2020) contend that adaptive mobile-based learning platform activated in collectivistic environment helps to scaffold learning experiences commensurate with students' preferences, needs, and capacities. Seamless integration between students' colloquial mobile communication and instructional orchestra denote a substantial boost to students'

English learning (Annamalai, 2019). From SLA spectacles, the findings resonate with Ke (2010) who underscores the essential of authentic tasks in project-based college English for nurturing language learners' motivation to excel in their academic trajectories and future career. In congruence with significant drive of MIM toward academic motivation and engagement (Alshaibani & Qusti, 2020; Andujar & Salaberri-Ramiro, 2019), TBML better aids language learners in accomplishing academic tasks inasmuch as MIM affords rich hybrid communication properties coherent with the students' lived experiences beyond the class. Coherent with Rambe and Mkono (2019), this study substantiates friendly and flexible multimodal communication as a precious resource for teacher to extend and foster language instruction beyond the class in a way which propels students' pedagogical rethinking and effective use of MIM social characteristics.

Laden with the collaborative values of project-based learning, TBML supports Hulme and Lee (2020) highlighting the advantages of mobiles to afford authentic language learning which taps upon students' intrinsic motivation in learning English and the added-values of cultural learning thereof. As the items germane to intrinsic motivation abovementioned imply self-regulation to acquire more extensive knowledge and cultures of English-speaking community, the study affirms the latent impetus of self-paced study and personalized learning for sustaining meaningful discussion and control over learning (Li et al., 2018). Merging language and content learning in pure literacy practices, the collaborative mobile learning engages students to research, share, and evaluate meaningful resources relevant to performing consequential tasks. This learning community transforms a mere task accomplishment into a literacy activity in which students meaningfully use linguistic and non-linguistic resources to impart and modify joint ideas to satisfy mutual reflection and evaluation (Ke, 2010).

RQ 2: TBML Significantly Improves Indonesian EFL Learners' Online Learning Engagement

Delving into online learning engagement (OLE), the other series of paired sample t-tests highlighted both significant increases and differences, within and across groups. The first findings in Table 2 corroborate noteworthy increase between pre-test and post-test scores across constituting elements of online learning engagement, germane to emotional responses, skills, performance, and participations. The analysis marked significant increases in all aspects of OLE within the experimental group, indicated by $p < .05$.

TABLE 3
Group's Online Learning Engagement by Paired Sample Tests

Pairwise Comparison	Pre test	Post test	*SD*	*SE*	*df*	*p*
Experimental Group						
Overall OLE*	3.9122	4.1958	.82049	.05330	236	.000
Skills*	3.9122	4.1958	.89933	.05842	236	.000
Emotion*	3.8541	4.1254	.88843	.05771	236	.000
Participation*	3.9170	4.2475	.94081	.06111	236	.000
Performance*	3.9409	4.2068	.92269	.05994	236	.000
Control group						
Overall OLE	3.9513	3.9966	.82408	.05342	237	.396
Skills	4.0662	4.0893	.92006	.05964	237	.699
Emotion	3.9166	3.9592	.88501	.05737	237	.458
Participation	3.9139	3.9713	1.00268	.06499	237	.378
Performance	3.9538	4.0112	.99222	.06432	237	.373

*$p < .05$

Despite increases evident in both groups, the analysis results in Table 3 confirmed significant differences on the gains between the experimental group and the control group, which is substantiated by $p < .05$. The findings clearly acknowledge the substantial impact of embracing TBML in increasing EFL

learners' online learning engagement, in comparison to the online instruction powered by video conferencing and LMS. Collaborative mobile learning leads to a marked increase in the learners' skills to organize their learning, positive emotional behaviors, participation in group collaboration, and overall learning performance.

TABLE 4
Group Gains in OLE by Paired Sample Tests

	Average Gains		Paired Sample Test			
Pairwise Comparison	Experimental Group	Control Group	*SD*	*SE*	*df*	*p*
Skills*	.2479	.0253	1.27321	.08270	236	.008
Emotion*	.2712	.0428	1.27005	.08250	236	.006
Participation*	.3305	.0563	1.35297	.08789	236	.002
Performance*	.2658	.0534	1.34297	.08724	236	.016

*$p < .05$

Following Vygotsky's (1986) collaborative learning theory, this study has corroborated the potency of language learning community mediated by mobile technology. TBML allows valuable interaction which triggers intensive engagement with language learning tasks and eventually leads to improved performance (Lin et al., 2019). The hybrid interaction in TBML creates a supportive and inviting environment for the learners to engage with peers and the tasks, thanks to the multiple textual as well as supra-segmental features in synchronous communication (Rambe & Bere, 2013). The findings in Table 3 highlight significant difference as regard the overall gains between mobile-mediated communication (MMC) and computer-mediated communication (CMC), further acknowledging the superiority of TBML over computer-assisted learning, with respect to resultant online learning engagement.

With the affordances of personalized learning management system, employing TBML allows the learners to better organize their learning both during and post instruction. As students become increasingly adept in organizing learning resources using Telegram, they can seamlessly navigate diverse learning resources at their own pace. The acquaintance with Telegram, particularly the group messaging with such informal natures as the departure from standardized message typography, repeated characters, emojis, and stickers, successfully merges the social and instructional spheres of class interaction. To that end, students are empowered to build and sustain self-regulation and internalization of their learning intensity (Xu et al., 2019), particularly with the initial scaffolding from peers and teacher. As the majority of learners report intensive learning skills upon engaging in group chat, monitoring and responding to discussion, and organizing their learning, TBML is proven to resonate the findings in Andujar and Salaberri-Ramiro (2019), who appreciate the value of spontaneity, interactivity, and dynamics in social constructivist ecology as the drives to linguistic development through shared trials and triumph.

As the learners acknowledge perfect fit between their learning experiences and TBML, they develop a sense of ownership, responsibility, and control shared among team members. Myriads of supports and resources accorded by TBML afford the convergence of students' attributes (skills, emotions, and capacities) to vent their hardships upon task accomplishment and voice their ideas in democratic expressions through criticizing ideas, initiating discussion and collaborative reflection, and co-constructing learning artifacts. The positive emotional outcomes subsequently lower psychological barriers to partaking in sociocultural activities in the class (Alshaibani & Qusti, 2020). By the same token, the sociocultural habitat lends itself to developing authentic relationship between learners and teachers, while concomitantly negotiating asymmetrical power and de-emphasizing differentials (Rambe & Mkono, 2019). This slight relational shift in emerging informal learning spaces encourages every student to voice their ideas, mediating the intrapersonal and the sociocultural practices in their surroundings. The inherent authentic relationship between interactants stimulates the unpeeling of students' true selves and subsequently accords them with stronger agency and more discourse access to the co-construction of knowledge (Kukulska-Hulme & Viberg, 2017). MIM plays crucial role in this regard, as it compensates learners' suboptimal linguistic proficiency by the affordances of emoticons, stickers, and informal exclamations from interactants. Following Lai et al. (2013), TBML creates a liminal zone between formal

and informal learning wherein students can engage in knowledge-building tasks authentic to their life, as a result of MIM facilitating coordination, collaboration, and communication.

Albeit perceptive in nature, the reported gain in the linguistic performance has been found significantly different between groups. Learners engaging in TBML gain the freedom to access the learning resources and activities at their disposal, in addition to the multiplicity of media afforded by the teacher. When powered by MIM, each group member is accorded with the speed, security, and simplicity of MIM (Lai et al., 2013). The authentic students-centric activities in TBML enable the rapid flow of information and offer the opportunity to resort to learning resources pertinent to students' needs (Zhu & Wang, 2020). The spontaneity and permanence of MIM enable learners to revisit their learning anytime and anywhere. Such serendipitous learning enables learners to demonstrate language performativity, and at the same time receive feedback from peers and teachers (Alshaibani & Qusti, 2020; Kukulska-Hulme & Viberg, 2017). As the statistics reports the magnitude of self-regulation and collaborative engagement, the present study has evinced the interactive properties of MIM in sustaining socio-constructivist practices as the stimuli for linguistic development through noticing and negotiation of meaning scaffolded by dialogic interaction (Vygotsky, 1986; Xu et al., 2019).

RQ 3: TBML Significantly Improves Indonesian EFL learners' Trait Emotional Intelligence

The last analysis reveals another significant increase within groups, which compares pre-test and post-test scores. TBML results in a significant increase in learners' trait emotional intelligence manifest across domains, in comparison to regular online learning activities. Referring to Table 5, this premise attends to $p < .05$ noted in paired sample tests pertaining to both the overall and domain-specific increase between pre-test and post-test.

TABLE 5
Group's Trait Emotional Intelligence by Paired Sample Tests

Pairwise Comparison	Pre test	Post test	*SD*	*SE*	*df*	*p*
Experimental Group						
Overall TEI*	3.8039	3.9480	.79174	.05143	236	.006
Intrapersonal composite*	3.7215	3.8599	.87455	.05681	236	.016
Interpersonal composite*	3.9791	4.1043	.90987	.05910	236	.035
Adaptability*	3.8696	4.0060	.95016	.06172	236	.028
Stress management*	3.4346	3.6456	1.16345	.07557	236	.006
General mood*	4.0190	4.1498	.98816	.06419	236	.043
Control Group						
Overall TEI	3.8760	3.9025	.91176	.05910	237	.654
Intrapersonal composite	3.7916	3.8218	1.00165	.06493	237	.642
Interpersonal composite	4.1092	4.0952	1.06506	.06904	237	.839
Adaptability	3.9006	3.9412	1.03240	.06692	237	.544
Stress management	3.5021	3.5819	1.30640	.08468	237	.347
General mood	4.0714	4.0777	1.06288	.06890	237	.927

*$p < .05$

The significant increase resulting from socio-constructivist environment and democratic practices propel the students to embark on their self-disclosure and self-projection. Affirming the study by Rambe and Bere (2013), such ambient habitat allows teacher and students to identify the whole self of each group member when involved in social and academic practices. Deploying the multimodal features in MIM, the students gain the flexibility to actualize their language performativity and vent their distress due to suboptimal linguistic proficiency. As the students gain feedbacks and recognition for their performance and contribution, they build the self-esteem and self-efficacy when they manage to satisfy task requirement. This iterative, collective undertaking manifests the essentials of comprehensive input,

comprehensive output, noticing of a new language, and negotiation of meaning required for language learning (Kukulska-Hulme & Viberg, 2017).

Notwithstanding suboptimal proficiency, collective linguistic limitation becomes the fuel to shared contrivance of learning artifacts, from which each student reshapes their performance and flexibly collaborates to elevate their proficiency, by joint meaning making as a mediating process embracing individual capabilities, sociocultural practices and ecological factors (Kukulska-Hulme & Viberg, 2017). This study supports previous works which underscore collectivistic natures of collaborative mobile learning as the stimuli to cognitive scaffolding and the catalyst of positive affectivity shared among members of learning community (Kukulska-Hulme & Viberg, 2017). Despite the challenges to mobile learning (Annamalai, 2019), TBML can serve as the academic theatre and emotional conduit where the students gain full liberty to disclose their hardships and collaborate upon problem solving as well as co-construction of knowledge.

TBML, with its affordance of co-construction of knowledge and joint language production, allows teacher and students to engage in meaningful activities with rich authentic resources pivotal to students' meaning making (Dixson, 2010). Interactive communication enabled by MIM comes to its element as the students deploy diverse textual, pictorial, and multimodal features to share their ideas and express their emotion. Using banter and humor as the adhesive to the regular academic discourse certainly creates more humanistic interaction between teacher and students (Rambe & Mkono, 2019), while concomitantly bringing down tension and confusion. Jocular nuance in TBML serves as the interlude during academic engagement to aid the students in mitigating stress and maintaining positive emotions.

RQ 4: Significant correlations exist between TEI, OLE, and EFL Learning Motivation

Pearson's Product Moment confirmed significant positive correlations between three variables under investigation. The correlations were moderate as evinced by coefficient value ranging from .506 to .610, with p = .000 in each computed correlation. In consideration of ensuring unified correlation with EFL learning motivation, only intrinsic and extrinsic motivations are taken into account. Table 6 presents detailed correlations among pertinent variables.

TABLE 6
Pearson's Product Moment on Correlation between Variables

		TEI	OLE	Motivation
TEI	Correlation	1	.610**	.506**
	Sig. (2-tailed)		.000	.000
	N	237	237	237
OLE	Correlation	.610**	1	.559**
	Sig. (2-tailed)	.000		.000
	N	237	237	237
Motivation	Pearson	.506**	.559**	1
	Sig. (2-tailed)	.000	.000	
	N	237	237	237

***. Correlation is significant at the 0.01 level (2-tailed).*

The study has unraveled noteworthy links between the emotional, motivational, and cognitive properties of EFL learners when partaking in TBML. The findings are in accordance with Abdolrezapour and Tavakoli (2011) who document the potency of literature activities, congruent with reading and writing within discipline-related context in the present study, as instructional method which raises emotional intelligence and cognitive functioning, which represent two intertwined properties driving academic engagement and language performance. The correlation is in line with a previous work documenting multidimensional properties of autonomous learners concerning strong emotional characteristics supportive to learning engagement, resilience, and efficacy (Ahmadian & Ghasemi, 2017). In the same vein, a number of previous

works corroborate the influence of emotional wellbeing and environmental factor on robust motivational and intellectual drives which support students' resilience in dealing with complex cognitive tasks (Wurf & Croft-Piggin, 2015). Project-based English in TBML aptly nurtures students' self-regulation and self-efficacy for not only accomplishing meaningful tasks but also growing in a community of learning.

The fact that all three variables have been significantly raised underscores the pedagogical potency of TBML to deal with disengagement and attrition issue reported among university students (Shah & Cheng, 2019). Yun and Park (2020) contend that environmental factors, interest elevation, goal orientation and behavioral enforcement are associated with emotional and cognitive engagement in higher education. To this end, the present study has portrayed how mobile collaborative learning grounded in literacy practices serve as the catalyst to students' performativity and outcome in language learning (Kukulska-Hulme & Lee, 2020; Rambe & Bere, 2013). This resonates the findings documenting OLE associated with the two highest correlations between the three variables.

Conclusion

The present study has evinced the pedagogical potency of TBML to leverage learners' emotional, motivational, and cognitive mutual engagement as a result of meaningful meaning making and literacy practices in a liminal learning ecology. Employing TBML, particularly in response to the hardships of online learning at tertiary education, empowers English language teachers to develop an inviting terrain for learners of any proficiency levels to explore diverse literacy activities laden with authentic language resources and cultural appeals. Appropriating MIM in college English learning constitutes a convergence of learners' personal properties (emotion, motivation, and engagement), socio-cultural environment, and mobile technology to empower more students-centric literacy activities. For this empowerment to persist, language teachers need to harness MIM and English as the fundamental tools to scaffold stronger learners' agency in co-constructing knowledge and language artifacts authentic to their lived experiences. In so doing, TBML has been found effective to stimulate community of learning through application activity, as exemplified in project-based learning. Future studies are advised to scrutinize how students interact with and navigate myriads of learning resources when partaking in TBML. As this study has yet to delve into actual language performance, an experimental or correlational study germane to students' language learning achievement will contribute to the understanding of TBML in tertiary environment. Employing structural equation modeling can also aid in better understanding the multidimensional linkages among the constructs under investigation. In addition, interview and retrospective reflections can offer more in-depth insights into the benefits and shortcomings of TBML. The findings have several pedagogical implications. First, the motivational, emotional, and cognitive gains corroborate the seamless integration of MIM into regular teaching praxis. However, effective use of MIM has to be warranted by ensuring sufficient scaffolding to learners' participation. A mere integration of MIM would otherwise easily lead to amotivation and disrupted attention to learning. In addition, as only few components of motivation measure demonstrate positive gains, teachers need to carefully integrate MIM in their teaching to make it as motivating as possible.

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