WHAT ARE THE ROLES OF EDUCATIONAL ELECTRONIC TOOLS IN READING MOTIVATION?

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Abstract

Learning motivation mostly predicts overall academic achievement which is likely correlated to either students' academic success or failure. All of the studies reviewed are empirical in nature which a pre-post-test random assignment experiment design. All of the studies assigned students to control group and experimental group to compare students' reading motivation and reading comprehension after conducting reading activities by using ICT tools or/and DERs. Two main types of educational technology tools (ICT and DERs) are likely mediate and enhance reading motivation as well as reading comprehension through personalized activities and engaging activities. Though, technology provides students with various interactive features that can suit students' learning style and learning level, framework and approaches like constructionist framework, top-down and bottom-up approaches, as well as learning from technology and learning with technology concepts will navigate learning activities on what ways and how the technologies are used in reading activities, thus improve students' reading motivation, reading comprehension, and reading fluency.

Keywords: Reading, educational electronic tools, motivation.

INTRODUCTION

Learning motivation mostly predicts overall academic achievement which is likely correlated to either students' academic success or failure. In educational perspective, Lazowski and Hulleman (2016) classifies motivation into needs, drives, goals, aspirations, interests, and affects which are derived from social-cognitive theories of motivation. Learning motivation as a predictor of academic achievement triggers plethora studies to investigate the factors affecting students' learning motivation. Technology integration is a factor that has roles in affecting learning motivation corresponding to a better educational quality through its roles in facilitating learning and enriching learning, for example through gaming technology implementation (Tsyganova, Zubkova, Bystrova, Kutepova, & Kutepov, 2021), Massive Online Open Course (MOOC) (Deshpande & Chukhlomin, 2017), and multimedia learning (Yasin, Anwar, & Luneto, 2021).

In similar notion, technology integration is correlated to reading motivation which is one of the predictors of reading achievement. Technology, in English language learning context, has promising roles to trigger learners' reading motivation (Rajabi & Khodabakhshzadeh, 2015), reading comprehension (Ratminingsih, Mahadewi, & Divayana, 2018), and intrinsic learning motivation (C. H. Chen, 2020). Intrinsically, motivation predicts students' English as a Foreign Language (EFL) achievement (Ahmetović, Bećirović, & Dubravac, 2020), measures self-regulated and collaborative learning (Bailey, Almusharraf, & Hatcher, 2021), influences reading strategies (Yau, 2021) and improves speaking fluency (Sevy-Biloon & Chroman, 2019), however P.-H. Chen (2019) reports that no significant contribution of intrinsic motivation to EFL reading achievement. Despite the absence of intrinsic motivation contribution to the reading comprehension, a growing number of studies has found that technology impacts reading motivation which in turn promote students' reading achievement (P.-H. Chen, 2019; Ciampa, 2015; Moon, Francom, & Wold, 2021; Rajabi & Khodabakhshzadeh, 2015; Yau, 2021).

As reading motivation is proven to influence reading achievement, and reading achievement predicts overall academic success, therefore, this paper review studies investigating technologies intervention in promoting reading motivation and reading comprehension. The studies were reviewed in terms of the roles of technology to motivate students in reading through on screen reading (Liman Kaban & Karadeniz, 2021), smart board implementation (Rajabi & Khodabakhshzadeh, 2015), iPad application (Moon et al., 2021), and computer-assisted interactive reading model (Bahari, Zhang, & Ardasheva, 2021). In addition, this review will also focus on types of technology use, framework use in the study, research methodology, and instrument use to examine the reading motivation which may inform future studies in similar field.

Articles' Analyses

Studies (Bahari et al., 2021; Liman Kaban & Karadeniz, 2021; Moon et al., 2021; Rajabi & Khodabakhshzadeh, 2015) investigating the roles of technology in enhancing reading motivation were reviewed based on the following research questions:

1. What are technology tools used in the studies?
2. What are frameworks used in implementing the technology tools?
3. What are the roles of the technology tools in enhancing reading motivation?
4. What are the research methods to conduct the studies?
5. What are the instruments used to examine students' reading motivation?

Technology Tools

Various types of technologies used in the studies are classified into two types which are Digital Educational Resources (DERs) and Information and Communications Technology (ICT). ICT refers to tools functioned to create, search, select DERs, such as computer, mobile phone, interactive whiteboard, and iPad. DERs refers to electronic form of teaching materials such electronic books, educational apps, videos, audios, games, and animations (Alberola-Mulet, Iglesias-Martínez, & Lozano-Cabezas, 2021). ICT tools implemented to investigate students' reading motivation are smart board (Rajabi & Khodabakhshzadeh, 2015) and computer (Bahari et al., 2021). Other researchers used DERs such as iPad applications (Moon et al., 2021), pictures and video clips (Bahari et al., 2021), and personalized/gamified/PDF electronic reading (Liman Kaban & Karadeniz, 2021).

Bahari et al. (2021) implemented computer-assisted language learning (CALLS) tools that includes DERs (pictures and video clips related reading topics) in reading comprehension blended and distance learning class. 278 Iranian students used the tools in reading activities that include pre-reading activities, during reading activities, and post-reading activities. In similar vein, Rajabi and Khodabakhshzadeh (2015) utilized smart board to investigate 90 EFL learners' reading comprehension and intrinsic motivation after being taught by using the smart board. Moon et al. (2021) explored 47 elementary school students' reading comprehension and reading motivation after using iPad applications in their reading activities. Liman Kaban and Karadeniz (2021) also implemented personalized/gamified/PDF electronic reading practices to 96 elementary school students to examine their e-reading experience in terms of reading comprehension and reading motivation.

Finding 1   There were two types of technology tools used in the studies reviewed namely ICT and DERs. ICT types of technology are smart board and computer, meanwhile DERs which were used are iPad applications, pictures, video clips, and personalized/gamified/PDF electronic reading practices.

Technology-Based Learning Framework

Technology-based learning differs from face-to-face learning in terms of its environment, learning centre, learning activities, learning material, as well as its assessments process. Therefore, determining technology-based learning framework before conducting technology-based learning is prominent. Some of the frameworks employed in the studies reviewed are CALL and computer-assisted interactive reading model (CAIRM) (Bahari et al., 2021), constructivist learning theory (Moon et al., 2021), personalized electronic reading (Liman Kaban & Karadeniz, 2021), and computer enhanced learning (Rajabi & Khodabakhshzadeh, 2015).

CALL and CAIRM, as the framework of the study conducted by Bahari et al. (2021), focuses on interactive reading as a factor of reading fluency. This framework comprises bottom up and top-down reading activities and strategies which concentrates on the smallest linguistic units to extensive units, and on global aspects to smaller units respectively. The researchers integrated CALL tools and affordances for bottom-up processing with CAIRM to activate learners' processing mechanisms comprising 1) skills-based mechanisms (digital literacy skills focusing on discovery-learning skills, critical thinking skills, and noticing skills); 2) synthetic mechanisms (convergent tasks, convergent strategies, and global-local strategies); 3) data-driven mechanisms (concordance, individualization and personalization, and corpus annotator); 4) inductive mechanisms (recognizing patterns, generalizing rules, and making conjectures). The Call tools and affordance also employed for top-down processing that includes 1) strategy-based mechanisms (graphic strategies, reverse engineering, and big picture); 2) analytic mechanisms (modelling, prompting, and fading); 3) conceptually-driven mechanisms (questioning, visualizing, summarizing); and 4) deductive mechanisms (teacher mediation, rule-driven analysis, pattern-driven analysis).

Moon et al. (2021) referred to constructivist learning theory to utilize iPad apps in reading activities. The researchers argue that the effectiveness of iPad-enhanced learning activities depends on its consistency with constructivist learning theory. Based on the theory, active learning occurs in authentic contexts where learners are able to make sense of the world around them relying on social interaction. In accordance to this theory, the researchers borrowed constructionist theory of technology-enhanced learning which focuses on students actively navigate technology to seek for information, organize and articulate ideas, self-direct learning, rather than only

watching or listening to technology-based instructional materials or just doing media-based drills (Jonasssen, Myers, & McKillo, 1996; Kafai & Resnick, 1996). This concept refers to learning with technology where students learn by designing what is so called artifacts (media, games, audios, videos, websites) that allow them to experience productive meaning making and thinking learning activities (Howland, Jonassen, & Marra, 2011; Kafai & Resnick, 1996). Jonassen et al. (1996) classify constructionist theory into four principles namely, 1) knowing reflected by designing, 2) knowledge construction, 3) learning with technology instead of learning from technology, and 4) distributed thinking.

Liman Kaban & Karadeniz (2021) refers to personalized electronic reading and gamification approaches in their investigation of e-reading to children. Personalized electronic reading offers learners personalized activities to experience reading activities as if they are the characters in the story by creating their own avatars. Therefore, learners experience interactive activities namely, recording their voices, story listening, having immediate feedback and help, highlighting text, making use of hotspots, sharing reading, and having story authorship. The personalized reading was accompanied by gamified electronic reading useful for engaging students in reading by providing them rewards for each accomplishment such as earning badges, awards, and score which stimulate their motivation. A sense of competition is also a characteristic of gamified electronic reading in which the students compete with one another to be the leading player shown in a leader board.

Rajabi and Khodabakhshzadeh (2015) do not directly state the approach or framework they use in the study, but computer enhanced learning approach is highly likely to be the approach they used in implementing smart board in the reading activities. The smart board, one of the smart versions of computer, enhanced the activities of learning by creating an enjoyable learning environment, therefore motivates and engages students in their reading.

Finding 2   A technology-based framework/approach, such as computer enhanced learning activates students' motivation, and constructivist learning theory creates active learning through learning with technology concept. Other researchers combined two approaches/framework two double the impacts to reading comprehension and motivation such as CALL combined with CAIRM, and personalized electronic reading combined with gamification.

The Roles of Technology Tools in Enhancing Reading Motivation

Bahari et al. (2021) claim that digital features (graphics, symbols, hyperlinks) in their study enrich distance learning environment and facilitate learners with learning environment that suit individual's learning style and level. In addition to the digital tools, an interactive whiteboard also provides interactive feedback to the students. Interactive reading through the technology tools enables teachers to monitor reading difficulties in which teachers can directly switch the reading level if they find learners having issue with the lexical and structural difficulty. Therefore, the tools trigger learners positive reading attitudes in blended and distance learning environments and foster their reading motivation.

IPad applications in Moon et al. (2021) study mainly serve as a tool that facilitate the learners to create their artifacts (learning materials) such as comics, presentations, and animations, recorded lessons, concept maps that shows the learners' understanding towards readings they did, these roles belongs to learning with technology concept. Since this study compared two groups, experimental and control group, in terms of technology use in reading activities, the control group used the iPad merely for reading, watching, and responding to drills as the concept of learning from technology. From creating the artifacts, the students involved their higher-level thinking, creativity, self-control learning activity and personal understanding resulting in a high reading motivation. It is also reported that iPad applications accelerate learners' attention and satisfaction through learning with technologies activities. Additionally, the learning with iPad applications and the learning from iPad improve learners' reading fluency and reading comprehension.

Liman Kaban and Karadeniz (2021) found that both personalized e-reading and gamified reading boost students' motivation. The personalized and gamified reading activities allow students to navigate their learning goals and choose learning aids that in turn improve self-efficacy. Unfortunately, the researchers found no significant correlation between motivation and reading comprehension due to students' poor performance and skill level. However, both e-reading activities directly improved students' reading comprehension since it provides students with a computerized dictionary which helps the students with vocabulary problems.

Rajabi and Khodabakhshzadeh (2015) revealed that smart board increases students' intrinsic motivation through enhancing students' interaction, participation, and personal engagement. In addition to the increase of students' intrinsic motivation, the smart board also successfully mediate EFL reading activities which promote students' reading comprehension.

Finding 3   Both ICT and DERs (graphics, symbols, hyperlinks, interactive white boards, iPad apps, games, and smart board) increase students' reading motivation extrinsically and intrinsically by allowing learners to have engaging and personalized activities and monitor their learning based on their learning style and level.

METHODOLOGY

All of the studies reviewed are empirical in nature which a pre-post-test random assignment experiment design. All of the studies assigned students to control group and experimental group to compare students' reading motivation and reading comprehension after conducting reading activities by using ICT tools or/and DERs.

Bahari et al. (2021) assigned 278 intermediate EFL learners to a control group and three experimental groups. In the experimental group the effectiveness of CAIRM model was tested by implementing the bottom-up approach in one experimental group, a top-down approach in another experimental group, and combining both approaches in the other experimental group. The students were randomly assigned to each group, group one consisting of 66 students experiencing CAIRM intervention based on bottom-up approach, group two consisting 68 students receiving treatment based on top-down approach, group three comprising 74 participants having CAIRM intervention based on both of approaches, and control group consisting 70 students having regular reading activities.

Moon et al. (2021) also compared two groups reading comprehension and reading motivation of control and experimental group after having reading activities by using technology. Unlike the study of Bahari et al. (2021) whose control group has reading activities without using technology, Moon et al.(2021) used technology in both groups. The experimental group got reading activities based on the concept of learning with technology in which students create their own artifacts, while the control group only use technology for receiving information, reading, and answering questions which are based on learning from technology concept. 47 primary school students were participated in this study.

Liman Kaban and Karadeniz (2021) conducted a quasi-experimental study which participants (96 primary school students) of the study were randomly assigned to control and experimental groups. There were three types of experimental groups – gamified reading group comprising 24 participants, personalized e-book reading group consisting 24 participants, PDF guided reading program consisting of 24 participants, and printed guided reading program also comprising 24 participants.

Rajabi and Khodabakhshzadeh (2015) randomly assigned 52 EFL lower-intermediate learners to control group (26 students) and experimental group (26). The students were selected based on quick placement test' results. The students in experimental group learned by using smart board and other DERs such as pictures and video-clips related to reading topics. In contrast, the students in control group did not use the smart board in their learning process and only used printed reading materials.

Finding 4   All of the studies used a pre-post-test random assignment experiment design. Two studies have several experimental groups to compare different interventions by using ICT tools or/and DERs, and the other two only compare two groups, one control group and one experimental group. All of the participants in the studies were randomly assigned to the control group as well as to experimental groups.

Reading Motivation Instrument

Various instruments are available to gauge information on reading motivation, some of them are questionnaire, interview, and observation. The studies reviewed used questionnaire to investigate students' reading motivation change after implementing an intervention through ICT tools or/and DERs.

Rajabi & Khodabakhshzadeh (2015) employed Intrinsic Motivation in English Reading Questionnaire (IMERQ) to investigate the impact of smart board mediated reading activities. The questionnaire comprises 18 items consisting of 6 items about reading curiosity, 6 items about reading involvement, 2 items regarding importance of reading, and 4 items concerning on work avoidance. The questionnaire was adopted from Guthrie and Wigfield (1999). The participants of this study responded to the questionnaire before and after the intervention.

Bahari et al. (2021) administered the CAIRM questionnaire to gauge information on students' reading motivation which focuses on students' overall efficacy (5 items), bottom-up processing strategies efficacy (4 items), and top-down processing strategies efficacy (4 items). The questionnaire is 6-point Likert-scale in which 1 indicates strongly disagree to 6 indicates strongly agree.

Moon et al. (2021) utilized the reading habits survey consisting questions regarding reading enjoyment, understanding and iPad apps use to their respondents. This questionnaire was self-developed by the researcher in their previous study and administered to students before and after the treatment by using the iPad apps.

Liman Kaban & Karadeniz (2021) employed a 4-point Likert-scale reading motivation questionnaire developed by Baker and Wigfield (1999) in their study to investigate students' reading motivation before and after the implementation of electronic personalized and gamified reading. The Motivation for Reading Questionnaire's (MRQ) scale 1 indicates very different from me to scale 4 indicates a lot like me. The questionnaire comprises subfactors of motivation namely, recognition, competition, self-efficacy, social, curiosity, and general reading motivation.

Finding 5   All of the studies reviewed either adapted or developed a questionnaire regarding reading motivation to investigate students' reading motivation change before and after a treatment. Most of the questionnaires are Likert-type which scale ranging from 1-6 and 1-4.

DISCUSSION

The reviewed studies utilized both ICT tools (computer, smart board, and white board) and DERs (hyperlink, iPad apps, pictures, vide-clip, graph, e-reading, symbols, and games) to mediate and enhance English language learning in terms of reading motivation and reading comprehension. The ICT tools are proven facilitate learners with personalized reading activity and reading enjoyment that can engage students in reading activities, therefore increase their reading motivation (Freiermuth & Ito, 2022). The learning with technology concept also triggers learners' critical thinking and creativity by creating their own artifacts and navigate their own learning phase (Fortunato, Moreira, & Simões, 2021). In addition, technology provides learners with various types of digital features that can fit learners' learning style and levels in which can promote learners' reading comprehension as well as reading proficiency (Qiao, Kai, Chu, Shen, & Yeung, 2022; Sezen et al., 2020).

The idea of comparing the technology-based interventions and the combination of the interventions in some experimental groups expands knowledge on how combining the intervention, in terms of technology tools (white board and digital features) use like in the study of Bahari et al. (2021), contributes more to students' reading motivation and reading comprehension. Combining interventions is not limited to technology tools only, but to combining frameworks or approaches that can enrich electronic reading activities (Liman Kaban & Karadeniz, 2021). It is also recommended that teachers should navigate students to move from learning from technology to learning with technology in which students are given the autonomy to create and control their own reading artifacts and activities in that by doing so they involve their critical thinking and creativity. One thing to keep in mind that, before implementing the technologies, both teachers and students have to be the native of the tools, thus, the initial step to be conducted is a training which the focus is on introducing teachers and students to how to work on the tools as well as to initially identify problems that might interfere the real learning activities.

Although all of studies reviewed utilized reading motivation questionnaire. It would be convincing if the results of the questionnaire could have been triangulated with data from interview and observations, or if it is possible with students' diary of their experience in using technology during their e-reading activities. By doing so, more information regarding the roles of the technologies in enhancing reading motivation, reading comprehension, reading fluency, as well as the problems the students might encounter during learning activities can be identified for revision purpose in the future.

CONCLUSIONS AND SUGGESTIONS

Two main types of educational technology tools (ICT and DERs) are likely mediate and enhance reading motivation as well as reading comprehension through personalized activities and engaging activities. Though, technology provides students with various interactive features that can suit students' learning style and learning level, framework and approaches like constructionist framework, top-down and bottom-up approaches, as well as learning from technology and learning with technology concepts will navigate learning activities on what ways and how the technologies are used in reading activities, thus improve students' reading motivation, reading comprehension, and reading fluency. Reading motivation questionnaire alone might give insight to the researchers on the change of reading motivation before and after the intervention, but triangulating the data from questionnaire with the data from interview, observation, and students diary likely expands the information gauged in terms of students' problems and difficulties in using the technologies, their preference regarding learning activities, and how the technologies with the approaches/concepts/approach can enhance learning, increase students' reading motivation, comprehension, and fluency.

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