

Chapter 2: Conceptual Framework

2.1 ICT Use and Academic Achievement

Instead of grouping all types of ICT use under one variable, it is essential to inspect how different types of ICT use may influence academic achievement. There are three particular aspects that are mentioned through this study, home use of ICT for leisure, outside school ICT for education purposes, and school use of ICT. Each of these aspects may vary in their influence towards reading attitude and reading achievement, as there is distinct intention towards the use of ICT. According to Kaisa Leino, who completed an extensive report on ICT use for reading literacy among Finnish youth, “various studies have reported that the perceived ability to use computers correlates with the PISA reading scores, but the effect of computers on student achievement depends on the specific ways in which the computers are used”(Leino 2014).

In Thomas Fuchs and Ludger Woessmann’s 2004 study of “Computers and Student Learning; Bivariate and Multivariate Evidence on the Availability and use of Computers at Home and At School,” they find that ICT influence on academic scores widely varied on how and where ICT technology was used ([Fuchs & Woessmann 2004](#)). In their study, “bivariate evidence on the relationship between computers and students’ educational achievement is highly misleading, because computer availability at home is strongly correlated with other family-background characteristics, bivariate results on computer availability at home are severely biased” ([Fuchs & Woessmann 2004](#)). Their evidence also shows that the “relationship between computers and student learning differs strongly between the mere availability of computers and their use as a communicational and educational device” ([Fuchs & Woessmann 2004](#)).

2.1.1 ICT uses for leisure

With growing access to technology, students of all ages have access to a multitude of platforms for learning, sharing, and connecting. Although access to ICT varies based on country's socio-economic status, a number of previous studies have shown ICT use for leisure may impact academic scores positively. In Xiang Hu's study of ICT and student literacy in mathematics, reading and science across 44 countries, he found that those who used ICT devices at home for entertainment achieved higher scores (Hu, 2018). Hu also discovered a positive association between student's interest in ICT and their science scores. Bulut and Cutumisu found similar results in Turkey, when at home ICT entertainment positively correlated with higher science scores (Bulut and Cutumisu, 2018). While some studies found a direct relationship between ICT used for leisure and academic achievement, Luu and Freeman inspected a more indirect approach. In their study, they found that those with increased competence towards basic ICT tasks were able to attain higher science scores in Australia and Canada (Luu and Freeman, 2011).

Some explanations for the positive correlation between ICT leisure use and academic achievement is that students are able to attain important navigation skills from digital reading. According to Leino, "navigation skills are important in digital reading, and those skills are probably better with more active users (Leino, 2014, p. 109). Furthermore, "the literacy practices students use in their leisure time are an important part of their socialization to different kinds of text" (Leino, 2014, p. 47). Although some positive correlations were identified between ICT leisure use and academic achievement, other studies have found there to be a negative effect when inspecting other variables and locations.

Although identifying a positive association in Turkey, Bulut and Cutumisu also found that ICT use for entertainment at home was negatively correlated in Finland in PISA 2012 (Bulut and Cutumisu, 2018). Dominik Petko had similar results in his 2017 study, in which they found that ICT use for entertainment at home negative predicted science scores using the OECD countries' average for PISA 2012 (Petko, 2017). In Bryce Odell's study of ICT and Science in the PISA 2015 for Bulgarian and Finnish students, "ICT technologies at home and at school for schoolwork or entertainment were found to have a negative association with science scores" (Odell, Gavlovan, Cutumisu 2020, p. 11).

Some of the results also showcased there to be no relations such as ICT being at home had no relationship to the science scores of Finnish students (Bulut and Cutumisu, 2018).

2.1.2 Use of ICT Outside of School for Education

In the modern world, especially after Covid-19 pandemic, ICT use for education outside of school has become a common reality. Although exacerbated by the pandemic, there has been strong initiative to "equip schools with technology for educational purposes, "which has expanded to ICT use outside of school for teachers to "assign and monitor homework completed by students" (Magalhaes, 2020). The use of technology inside and outside of school for educational purposes is commonly seen as a human advancement towards elevating access to knowledge. According to the Organisation for Economic Co-operation and Development Report (OECD) of 2014, "48% of students reported using a computer to do homework, 38% to using e-mail to communicate about schoolwork with their peers, and 33% to sharing school-related materials via computer (Magalhaes 2020). Various studies have reported that ICT use outside of school had either a positive, negative, or no effect on academic and reading literacy.

Patrick Bussiere and Tomaz Gluzynki completed an analysis on “The Impact of Computer use on Reading Achievements of 15-year-old” in Canada. In their study there was a positive correlation between those that used a computer outside of school and their PISA reading score. “More specifically, students who reported using a computer at home at least a few times a month had the highest scores on the PISA reading test, while those who reported never using one scored two-thirds of a reading level below their peers” ([Bussiere and Gluzynki 2004](#)). Based on their findings, “students who reported at least three computers at home outperformed their peers without computers by roughly a full proficiency level” ([Bussiere and Gluzynki 2004](#)). While some studies found a positive effect, Xiang Hu and Dominik Petko reported negative correlations. Hu reported ICT use at home for school work was linked with lower science scores (Hu, 2018), and Petko, Luu, and Freeman reported similar results for the majority of the lower performing countries and completing homework through ICT technology at home (Petko, 2017 & Luu and Freeman, 2011).

While many studies showcased either a positive or negative connection between ICT use outside of school and academic achievement, a number of other studies also reported no association. According to Leino, “an international digital reading assessment in PISA 2009 showed that the students with the lowest scores were those who did not use computers at home for school tasks, but those who actively did so scored almost as low” (Leino 2014). Similar sentiments were expressed by Luu, Freeman, Bulut, and Cutumisu’s studies, which found no link between science scores and ICT use for homework (Luu and Freeman, 2011 and Bulut and Cutumisu, 2018).

2.1.3 ICT Use at School

The process of introducing ICT use to schools has been slow, as it is largely dependent on teachers and school budget (Leino 2014.) Given the high costs and lack of evidence for its positive contribution, “many schools and teachers are still reluctant to use educational technology and the implementation of educational technology has not necessarily led to the anticipated increases in educational quality,” this has made the topic of ICT use in schools a critical debate topic ([Pekto](#)). Many studies have either identified a negative relationship or no relationship between at school ICT use and academic achievement.

Bulut and Cutumisu, Hu and Pekto found a negative relationship between at school ICT use and science scores in Finland and Turkey (Bulut and Cutumisu, Hu, and [Pekto](#)). Leino reports that computer use at school “had a negative relationship to digital reading literacy scores” (Leino). Other studies found no relationship between school ICT use and academic achievement variables, this includes Hu’s, Bulut, and Cutumisu’s studies. Luu and Freeman also reported no significance between ICT use at school and science scores in Canada. Lastly, Pekto published that “for primary schools, PIRLS (Progress in International Reading Study) has repeatedly demonstrated that there is no clear correlation between the frequency of educational technology use in school and student reading scores ([Pekto](#)).

2.2 Attitude towards Reading and Reading Achievement

Another aspect this study inspects is the role of attitude towards academic achievement. Attitude may influence the way youth use ICT for academic and reading achievement. Based on Chang’s study on “Relationships of Attitudes Towards Homework and Time Spent on Homework to Course Outcomes,” a positive attitude towards homework is associated with higher

achievement ([Chang](#)). Smith and McCoy also explained that how students perceive academic work at home could largely influence their motivation to excel ([Smith and McCoy 2011](#)). This study inspects three variables that may influence attitude towards reading; students finding reading joyful, self-concept of competence or self-confidence, and reading ease. Patricia Alexander states that “why one reads, how one reads, and what results from that act are equally influenced by the motivations and affect at play, ” and that nontraditional or alternative texts process in out of school settings may be a key in reading motivation ([Alexander](#)).

When the relationship between ICT use and reading literacy is studied, some important factors should be considered. A social perspective on literacy accounts for the substantial differences between individuals regarding, for example, their motivations, beliefs, values and goals, and the wider social context. (Leino)

2.2.1 Enjoyment of Reading

Joy in reading provides students with a positive emotion when consuming knowledge. Students engaged in reading for their own purpose or pleasure “versus for certain academic tasks could right be appreciably different,” the student is more likely to be “adaptive and consistent “and “principled in its focus and disciplined in its processing”([Alexander](#)).

A study by Sumit Shukla among American and Chinese youth found that intrinsic motivation positively influenced text comprehension. “Intrinsic motivation was positively related to text comprehension in both U.S. and Chinese children when the variables of past reading achievement, extrinsic motivation, amount of reading for school, and amount of reading for enjoyment were controlled for ([Shukla](#)). Guthrie study of “Motivational and Cognitive Predictors of text comprehension and reading amount” also showed that “amount of reading for

school subjects and personal enjoyment predicted the level of children's text comprehension, while controlling for past achievement and prior knowledge ([Shukla](#)). Therefore, in this study, the intention of the individual seeking to pursue reading may impact the attitude

2.2.2 Perception of Reading Competence

Self-concept of competence or self-confidence inspects the extent in which students feel they have the capacity to excel academically. Self-confidence may alter an individual's attitude towards completing a particular academic task, such as reading. According to OECD 2011, "of the affective propensities that influence reading literacy, the essentials are self-confidence and engagement in reading ([Leino](#)). " In PISA 2000, students' belief in themselves as learners in the subject of their mother tongue did not seem to have a relationship with reading test scores on an international level, which compared countries, but on the national level a strong belief in one's abilities as a learner correlated strongly with good performance on the reading literacy test, " while the OECD report of 2006 indicated that confidence in ICT and performance in mathematics are correlated ([Leino](#)).

According to Frank Pajares in "Gender and Perceived Self-Efficacy in Self- Regulated Learning," students tend to engage in tasks they feel confident in and avoid those they do not. "Self-efficacy beliefs will also help determine how much effort students expend on an activity, how long they will persevere when confronting obstacles, and how resilient they will be in the face of adverse situations ([Pajares](#)). Pajares also mentions that "self-efficacy beliefs also influence the amount of stress and anxiety students experience as they engage a task" ([Pajares](#)). Therefore, self confidence may influence attitude towards reading.

2.2.3 Perception of Reading Difficulty

Some students may find it difficult to complete a book, thus becoming discouraged to elevate their reading levels, while other more advanced readers are able to complete a book within hours. This variation in ability may be a factor when analyzing attitude towards reading. According to Daisy Mae Soria, “there is a correlation between self esteem of students and their reading ability, reading level and academic achievement,” thus the book selection that students make can reflect and affect their reading ability and desire to read ([SC](#)). A student reading level may not grow due to the inability to improve reading ability. Those with a lower reading ability may be less inclined to take risks in their reading.

Espin and Deno in their study titled “Performance in Reading From Content Area Text as an Indicator of Achievement” found that there is a relationship between basic reading literacy and student academic success ([Espin and Deno \(1993\)](#)). Another study showed that “technical reading ability could predict a higher skill level at reading comprehension and math problem solving, when they controlled for technical reading, the covariance between word problem solving and reading comprehension was still present. ([Cimmiyotti](#)). It is also important to note that various factors may influence reading ability such as “cognitive ability and socio-economic status” that were also predictive of “reading ability than the level of reading interest” in Cimmiyotti’s analysis of students at the primary level ([Cimmiyotti](#)).

2.3 The Theory of Planned Behavior (TPB)

The theory of planned behavior (TPB) is theory revolving around human behavior. It states that “volitional human behavior is immediately preceded by intention to engage in this behavior,” thus “behavioral intention is predicted, in turn, by three main determinants: attitude

toward the behavior, subjective norm and perceived behavioral control ([Lee, Cerreto, Lee 2010 SC](#)). Therefore, positive belief in a new behavior, encourages other to create the norm of the behavior, and believe they are able to perform the behavior, help showcase the strength to adopt the new behavior. As a matter of fact, [Ajzen](#) (1991) himself have indicated that the attitude construct tends to take an intermediate level of explanation i.e. mediation. Following [Miesen's](#) (2003) application of TPB to reading, where he postulated that first, (Attitude) refers to the evaluation of reading by the reader themselves, second (Norm) refers to subjective beliefs about whether the reader should engage in reading, and third (Control) which reflects the obstacles in reading the reader had before. These three components correspond to the reading attitudes variables used in this study and therefore will be projected on them as ([Figure 1](#)) demonstrates.

2.4 ICT USE and Reading Attitudes

The next section of this study will analyze whether ICT has any influence on the reading attitudes previously depicted; the enjoyment of reading, self-concept of competence or self-confidence, and reading ease. As previously described, ICT use is widely prevalent among adolescents and access to different platforms and literature may inspire more reading.

According to a study completed in 2000, 66% of 15-year-olds in Finland use a computer at least a few times a week ([Leino](#)). The PISA 2000 showed that students use computers for a variety of activities, including games, communicating via email and other discussion platforms, and browsing the internet for topics of interests ([Leino](#)). This number further increased in 2008 to over 90%. ([Leino](#)). After the emergence of social media platforms such as Facebook, youth aged 11 and over were attracted to the instant communication with friends and family. Multiple studies have been produced to illustrate the social media use among the newer generation

[\(Leino\)](#). With a multitude of methods to communicate and increased access to knowledge, students may have increased incentive to read. Accessibility may have a significance role when analyzing the relationship between ICT use and reading ease.

According to a review by Patricia Alexander, students currently live in a world with extensive access to media, calling it the age of “hypermedia.” The age of hypermedia also includes flexible access to information. Readers are able to access information in a nonlinear manner ([alexander](#)). This means digital texts is consumed much differently than print. Easy access to reading may influence the concept of ICT influence on reading ease, as text is easily available and consumed. In terms of enjoyment, there are multiple indicators that may showcase the influence of hypermedia to influence enjoyment of reading, although neither swaying positively or negatively. Students have access to any kind of literature immediately through online platforms, they are able to locate their interests and read. Online platforms provide reading ease, and in the privacy of one’s digital device, students also have the reassured self confidence to access points of interest. Access is a vital component to influencing the three variables related to reading attitude, as it provides a path towards one’s interests and enjoyment, establishes a sense of privacy and self confidence in accessing, and is easily readable online.

Despite this, Alexander mentioned a couple of important factors that may influence the enjoyment of reading in the 21st century. Firstly, by accessing digital print, students are more likely to be multitasking. Once entering the online world, students may be unable to provide the cognitive and motivational resources to thoroughly enjoy a book of interest ([Alexander](#)). A wide range of data sources testify to the pattern of media multitasking among school aged learners

((Foehr, 2006; Lenhart, Madden, & Hitlin, 2005) [\(Alexander\)](#). Secondly, the access to instant gratification may lower the readers impact of enjoyment. As opposed to text print, online readers are able to quickly scan and read what they feel is relevant, possibly removing that joy and seeking instant gratification [\(Alexander\)](#).

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