

Chapter 5: Discussion

5.1 Overview

The advent of ICT and its integration within schools and teaching methods raised questions about what good ICT might add to students' achievement. Moreover, ICT has escalated students' digital reading at the expense of paper reading, which led to debates, on countries level, about the impact of students' use of ICT on their reading achievement. This study attempted to shed more light on this complex relationship between ICT modes of use and reading performance accounting for background variables, and if this relationship is mediated by students' attitudes towards reading across Denmark, Finland, and Sweden by examining the constructs of ICT use first via factor analysis, then running an econometric mediation model.

5.2 Answers to Research Questions

5.2.1 The ICT Constructs

ICT construct is relatively new tool introduced first in 2015, in fact, OECD has developed the ICT framework in 2021 where it advocated for ICT literacy as a standalone discipline to be assessed. This study reveals that while the ICT constructs are well-built, yet the items underlying them might not capture the whole picture. The ICT use at school for instance can be divided, similar to outside school, for both leisure and schoolwork. OECD has mentioned that "students' attention might be drawn away from learning and they might be tempted to use ICT resources for leisure activities such as games or social media". Furthermore, the ICT activities have evolved as new habits, practices, applications and communication apps are being introduced to 15-year-olds which raise a question about including activities(SC) such as "Using email for communication with other students about schoolwork".

5.2.2 ICT use and reading performance

Previous research has revealed discordant results about this relationship. While some studies assured positive relationships, other studies found the opposite or no relationship at all, this study obtained different results. In general, as Figure 10 shows, the relationship can be either negative or positive, depending on the type and frequency of use. In line with few other studies (SC)(SC)(SC), the findings in this study indicates a curvilinear relationship. In plain English, the ICT use is associated with reading literacy up to a certain amount or point, when the ICT use increase above this point, the association becomes negative.

To break down this relationship, using ICT for leisure seems to benefit students' reading to a greater extent than the other modes of ICT use, before extensive use starts to threat their reading performance, according to OECD, students indeed have opportunity to improve digital reading while using ICT for leisure (SC). In contrast, Students seem to be less tolerant to ICT use for schoolwork considering that mildly excessive use negatively covaries with less reading

performance. On the other hand, using ICT at school excessively is strongly associated with lower performance.

5.2.3 Mediation

Several studies confirmed a positive association between attitudes towards reading and reading performance ([SC](#)). This study aimed to explore if reading attitudes can mediate the relationship between ICT use and reading, i.e. would more use of ICT make students enjoy reading more? Find it easier to read? Or more confident to read? And subsequently achieve more in reading tests?

The mediation model revealed the mediating roles reading attitudes can play in the relationship between ICT use and reading, with enjoyment of reading ($R^2 = 0.382$) explaining the largest share of the variation in reading achievement, competence ($R^2 = 0.301$) and self-concept of ease ($R^2 = 0.244$).

5.2.4 Control variables

Even for countries privileged with the least gender differences and highest social welfare systems to narrow economic gaps, this study added evidence to abundant findings on students' gender and –to a greater extent– ESCS differences in academic achievement. The regression coefficients indicate that, controlling for other variables, girls score more than boys ($\beta = 0.124$), and students with one higher level of ESCS are more likely to achieve higher ($\beta = 0.307$). Moreover, according to OECD ([SC](#)) boys use ICT differently than girls, that average types of ICT use enhance the boy-gamer and the girl-communicator stereotype. A fact to consider when explaining the difference in reading achievement.

5.2.5 Countries differences

This study hypothesized the homogeneity of the three countries, yet the results marked differences in the relationships between students' ICT use, their reading attitudes, gender, ESCS and their reading achievement. It is tempting to interpret the results taking into consideration Finnish students' higher academic achievement. When asked about what accounts for Finland's education system success, the Finnish education minister joked that Finland's education goal was so simple: To do better than Sweden([SC](#)). Regardless of factors like highly qualified teachers, equal opportunities for all students, strong support for students needs and many others ([SC](#)), it is pertinent to mention Finland's successful integration of ICT into education under a national program called "Information Finland" back in 1996 the program aimed at "helping educational establishments acquire the necessary infrastructure, developing technical networking between schools, in addition to technological support, further education for teachers, and designing technological enriched environment ([SC](#)). Finally, it is Finland is marked by minimum homework given (maximum of 30 minutes) and the "learning is fun" method to motivate students([SC](#)) that students might indeed enjoy using ICT when doing homework.

5.3 Limitations

The issue of endogeneity: This study used self-reported variables even more students themselves decide how frequently to use ICT specially at home, this decision can be correlated with other personal characteristics other than the ones used in this study, which, as Farina et (2014) implied, might introduce bias.

The issue of causality: Due to the observational, not experimental, data this study used, this study establish correlational relationships and not cause-effect ones. This limitation has been mentioned in most of the studies that tackled this study's topic (Farina).

At last, this study examined only three countries that share a lot of similarities, overgeneralizing the results of this study to other countries must be carefully approached.

5.4 Conclusion

“Too much of anything is good for nothing”

Parents, teachers, and decision makers are increasingly interested in students use of ICT –inside and outside school— and its impact on their well-being and cognitive achievement. This study justifies their interest, and its results, rather than encourage or discourage more ICT integration in education systems, do endorse assessing and enhancing *adequate* ICT policies. “Adequate” can include detecting the exact right *amount* and *type* of ICT usage where it contributes positively to students' cognitive achievement and making sure not to exceed or fall behind this critical point. Finally, if further studies support and replicate the mediation effect of students' attitudes towards reading, science or math in the relationship between ICT use and academic achievement, decision makers will have profound and wider insights to design and implement these adequate ICT policies.