Chapter 4: Results

4.1   Descriptive Statistics and Correlation

Table 2 shows all the variables' univariate parameters of the population. Glancing the table, the sample sizes are relatively proximate, also stands out that ICT variables are more homogeneous between Denmark and Sweden than Finland. All the three countries score above the international average of reading performance (453.4), Finland comes first amongst the three, and second in Europe. As for the predictors, students in the three countries reported notably higher than the international average (0.02) use of ICT devices at school, likewise, in Denmark and Sweden the mean score of the ICT use outside school – both for leisure and schoolwork— is higher than international average (0.09 for schoolwork, 0.02 for leisure), interestingly the Finnish students reported lower averages than the international ones for both variables.

Moving on to the most important background variable, the ESCS averages of the three countries put them within the international upper half of the third quartile (ESCS international average is -0.28). With regard to data normality, following Hair et al. (2010) and Bryne (2010) suggested cut offs for normality when the skewness is between ±2 and kurtosis between ±7, the statics shows that normality is maintained for all variables except for minor immoderate kurtosis of ENTUSE. For broader view, Figure 6 visualizes the distribution differences in ICT use variables between the countries. However, Mplus estimator is prepared for possible non-normality when implementing the model (Muthén & Muthén, user guide).

Correlations between the variables are presented in Table 5 , most of the correlations between ICT variables and reading attitudes are significant yet not strong ($\rho \leq 0.09$). In contrast, students who more often use ICT devices at any given place (inside or outside school) for a given purpose (for leisure or schoolwork) would more often use them at the other place for the other purpose ($\rho \geq 0.43$). Background variables correlate differently with other variables, while higher ESCS is strongly associated with positive attitudes towards reading and reading achievement as well, being an immigrant, first or second generation, is negatively associated with reading achievement. Lastly, girls seem to enjoy reading more than boys who tend to spend more time using ICT devices for leisure.

4.2   Testing for multilevel structure:

PISA uses clusters design in its assessments, where students are nested in schools and schools are nested in countries, therefore it is a advised to consider hierarchical linear modelling (HLM) as it accounts for this clustering and consequently avoid statistical issues (SC). To test for HLM a null-model with no covariates was constructed to investigate the intraclass correlation coefficients (ICC), which indicates the proportion of variance that is accounted for by the group level, the result showed only 16% of the variation is due to clusters, which is below the 20% cut-off to consider HLM, this is explained by the shared educational, social, and economical systems of the three countries. For this reason single (student) level modelling was favored over multilevel modelling (SC).

4.3   CFA and EFA

The CFA demonstrated good items loadings in general (see Appendix X), all items had loadings $\lambda \geq 0.637$ for HOMESCH, and $\lambda \geq 0.364$ for ENTUSE (except for one item "Participating in social networks (e.g. <Facebook>, <MySpace>"). Such results suggests that all items are indicating one construct (SC). The CFA also showed good fit indices for the three variables as APPNDX demonstrate. While it is true that the fit indices for ENTUSE, especially in Denmark, are slightly short from Hu and Belter (1999) cutoff criteria, it is worthwhile noting that many researchers suggested that these are not golden cutoffs, as Marsh stated once "Conventional CFA [confirmatory factor analysis] goodness of fit criteria are too restrictive when applied to most multifactor rating instruments. It is my experience that it is almost impossible to get an acceptable fit" (SC).

The EFA results, on the other hand, for the USESCH variable revealed that not all the items are measuring the same one construct, Figure 7 shows that two items, namely, chatting online at school and using email at school are indicating the possibility of two constructs for this variable. However, further tests do not support such suggestion, for one test, the Kaiser-Guttman (SC) rule favors one construct over two (eigenvalue for one construct is 4.0 while 0.34 for two constructs) (, for the other test, the scree plot of Principal Component Analysis (PCA) also favor one construct model as Figure 8 shows.