6. Limitations and Need for Further Research

As is the case with any research, readers need to consider the presented results within the context of limitations. Also, the process of posing and answering particular research questions typically generates more questions that need to be explored through further research.

Most importantly with respect to the current research, readers need to remember that we considered only clearly determined population and sampling settings; reference to other settings may have produced different results. The extent to which our findings can be generalized certainly requires further investigation. The graduated influence of varying covariance distributions should be of particular ongoing interest given that this feature had large influences on the coefficients of variation of the various model parameters. Also, it may be worth exploring the influence of higher values of intraclass correlation coefficients because ICCs above 0.4 can be obtained for students in highly selective education systems.

We checked the results emerging from the simulations for their applicability to real data. We did this in preliminary format, using a small sample of real datasets from TIMSS 2007 (Grade 8 population). However, a systematic evaluation would be desirable in order to demonstrate the degree of applicability to real survey data.

Our preliminary verifications showed one limitation of this research: if the sample selection probabilities at Level 2 deviate from the explored conditions, the presented equations can no longer be applied (see Section 5.2.4 for more details). This phenomenon occurs in LSA when oversampling within certain explicit sampling strata is employed in order to accommodate precise parameter estimation for subgroups. Further research is needed to shed more light on this occurrence.

Extended investigations may also show whether the results hold true for distributions of the dependent and explanatory variables other than the ones explored here.

Finally, more research needs to be carried out on more complex models. A particular focus on random coefficients appears to be desirable.