

# Digital Appendix

für die Dissertation

Conception and Evaluation of E-Learning Units regarding  
Motivation and Acquired Competencies for  
Theoretical Computer Science  
at University Level

von

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# Overview

This digital appendix contains data and results of the dissertation *Conception and Evaluation of E-Learning Units regarding Motivation and Acquired Competencies for Theoretical Computer Science at University Level* by Arno Wilhelm-Weidner. Publication of this dissertation is currently planned for 2020. In this dissertation, the research process, and how the data was collected, is both explained in detail. For this reason, only a short summary will be given in this document. The data should enable researchers in the corresponding area to conduct further analysis.

For the dissertation, six studies were conducted in five different universities in courses on theoretical computer science. The aim was to find out whether Learning Units, designed as a supplement to these courses, would effect motivation and competencies of the students participating. Additionally, interviews were conducted with students in all locations to find out more about strengths and weaknesses of the approach. The survey data, analysis results of the surveys and analysis results of the interviews can all be found in this appendix.

Each of the chapters in this document corresponds to a folder in the ZIP-file, containing the respective further files.

In many cases, both SPSS outputs and PDF files are contained (for study results), or SPSS data files and CSV files (for study data). The content of these files is the same in these cases. The reason for this doubling is that the SPSS data and output files give a clearer overview and are easier to read and work with (e.g. for the data the values that mark missing answers are treated differently, variables and values are assigned to labels for easier analysis, ...), whereas the PDF files and CSC files are more sustainable and independent of both the purchase of SPSS licences and further development of SPSS.

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# Chapter 1

## (AN386) ANOVA test results

For the ANOVAs, the combined *FLAT Berlin* and *FLAT Potsdam* studies were used as well as the *ReSyst Berlin* studies. Each was reduced to those participants that had filled out all three surveys in the given study. Each for the combined *FLAT* studies and the *ReSyst Berlin* study, a robust repeated measures ANOVA was computed, using the syntax explained and made available by Field in [Fie17]. For the *FLAT* studies, both for the QCM anxiety scale and the results on competencies, the ANOVA results comparing the groups were suggestive ( $0.005 < p < 0.05$ ), and therefore, post-hoc tests on both were conducted. For these tests, the Wilcoxon signed-rank test was used. No results that seemed related to the usage of the Learning Units could be found.

## Chapter 2

# (CO837) Correlation results

The corresponding folder contains the correlation results that are presented and displayed in the dissertation for the biggest studies as well as the results for the other studies. Additionally, correlation results for Berlin and Potsdam combining visual/verbal learning style tendencies with preferences for text or video in using the Learning Units are presented.

As the SPSS output documents give a much easier overview over these correlations than the PDF files, both are contained in the respective folders. The PDFs are combined for each of the six studies (e.g. the “FLAT Berlin” PDF contains the SPSS results for all three respective surveys and the repeaters).

## Chapter 3

# (MA629) Mayring results for open questions

The results for the open questions on platform usage and the resulting categories, both following the qualitative content analysis by Mayring [May00], can be found in the respective folder. The actual questions and the process of analyzing the data are both explained in the dissertation.

## Chapter 4

# (MA772) Mayring results for interviews

Due to low participation rates in the studies, additional interviews were conducted in all study locations. The results, as for the open questions analyzed using the qualitative content analysis by Mayring [May00], can be found in the respective folder.

## Chapter 5

# (PR813) Preprocessed Data of the Studies

The respective folders (*Data*) contains the preprocessed survey data of all conducted studies and additionally the data for the main studies reduced to those participants that filled out all three surveys. Furthermore, the respective folders (*Output*) contain the descriptive statistics and the significance test results for both these cases.

The meaning of each variable in the data can be found using the the questionnaires in this digital appendix (QU507).



## Chapter 6

# (QU507) Questionnaires for FLAT and ReSyst

For both one FLAT and one ReSyst study, the questionnaires can be found in this folder in their variable version, i.e. they display the actual questions as well as the key which variable and possible values this relates to in the survey results. Additionally to all three surveys each, for both FLAT and ReSyst the follow-up survey is contained in this folder.

## Chapter 7

# (RE264) Preprocessed Data for Repeaters

As explained in the dissertation, the data for repeaters (students that had heard the course at least once before), was analyzed separately. The folder contains the resulting survey data (*Data*) as well as the results on normal distribution of the data and significance tests. As only a small number of repeaters participated in the study, these tests were not done for all surveys in all study locations.

# Bibliography

- [Fie17] Andy Field. *Discovering statistics using IBM SPSS statistics, 5th edition*. SAGE Publications, London, November 2017.
- [May00] Philipp Mayring. *Qualitative Inhaltsanalyse - Grundlagen und Techniken*. Beltz, Weinheim, 7.aufgabe edition, 2000.