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Designing learning materials for inclusion classes

An empirical study of (group) work processes in relation to instruction materials

Objective and problem. Inclusive instruction with regular students and students with special needs is currently being strongly promoted. However, examining the published recommendations regarding the design of respective learning materials, it becomes clear that they are not necessarily founded on reliable empirical results. In many cases, these recommendations are based on personal teaching experience that have been reflected upon. There has been very little empirical research on how to design instruction materials for group or partner work phases that enable the envisaged work processes to take place so that a measurable learning outcome can be achieved. The project will involve exploring the language and graphic elements of work assignments and focus on identifying those that most positively influence the performance of students. Planned and carried out in the student laboratory "Maths is more", the study will be located in the subject Mathematics. However, the respective findings of the project are expected to be transferable to comparable work assignments in other school subjects.

Theoretical background. One approach for making work assignments legible for as many students as possible in an inclusive group work situation consists of applying the rules of "Leichte Sprache" ("simple language", cf. "Leichte Sprache" network at <http://leichtesprache.org>). Accordingly, careful consideration concerning language choice on the word level (word consistency, the use of simple, commonly used words, avoidance of specialist terminology, etc), on the sentence level (one message per sentence, simple sentence structure), as well as concerning the type of writing used (easily legible fonts) is an essential component. Another approach is to link the text with graphic symbols. Basic research is required in this area as there are very few findings on whether adding graphic symbols to texts improves text comprehension, and the few studies that have been conducted have not produced clear results. Jones, Long, & Finlay (2007) proved that the reading comprehension of adults with a learning impairment was better for texts with graphic symbols than for texts without. Participants with poor reading skills benefited in particular. The findings of Poncelas & Murphy (2007), on the other hand, suggested that adding graphic symbols did not automatically improve text comprehension. Theoretical considerations support the idea of linking text and graphic symbols as, for example, down-syndrome children have a better visual than auditive memory (cf. Frenkel & Bourdin 2009; Kay-Raining Bird & Chapman 1994). Therefore, this group of student, in particular, should benefit from assignments that combine text and graphic symbols. With regard to the design of graphic symbols, Wilkinson & Snell (2011) found out that the use of background colors or a three-dimensional image is not helpful.

This project aims at clarifying whether linking graphic symbols and text is necessary for students to understand and carry out work assignments as effectively as possible. There are three different options: (1) Using only text or (2) combining all key words with graphic symbols or (3) even using a symbol font, which adds an appropriate symbol to each word. The project follows the approach of Jones, Long, & Finlay (2007), who had positive experience with combining all key words with graphic symbols. These will be designed based on the METACOM 6 symbol system (cf. Kitzinger 2013).

As basic research experiments on memory capacity show that most people can only remember 7 +/- 2 pieces of information (cf. Dix 1998, 28f.; Niegemann et al. 2008, 43) and as this number is assumed to be considerably lower for students with cognitive impairments, the amount of information presented simultaneously should be strictly limited.

Relevance. The language used for the assigned tasks is of central importance for individual, partner, and group work phases in all subjects, at all types of school, and in all grades as well as for further education. Learners' self-regulated work and learning phases are only productive if the learners understand the assigned tasks and act respectively. If the empirical results of this research project enables us to derive essential criteria for designing tasks, they can be integrated into all phases of teacher training and further education and thus, students and learners at all levels of formal education could benefit.

Methodological approach. In a preliminary study, different ways of simplifying texts and linking texts and graphic symbols will be compared. Based on the results, the most promising variations will be selected. These variations will then be tested with an experimental and comparative group design with pre, post, and follow-up performance tests. In addition, individual groups from the different test conditions will be video-recorded while working on the assignment. The objective is to enhance the quality of students' text comprehension skills.

Possible dissertation topic

Design of learning materials for inclusion classes – An empirical study to identify characteristics for designing instructions for (group) work processes.

Literature

Dix, A. (1998). *Human-computer interaction* (2nd ed.). London: Prentice Hall Europe.

Frenkel, S. & Bourdin, B. (2009). Verbal, visual, and spatio-sequential short-term memory: assessment of the storage capacities of children and teenagers with Down's syndrome. *Journal of Intellectual Disability Research*, 53 (2), 152–160.

Jones, F. W., Long, K. & Finlay, W. M. L. (2007). Symbols can improve the reading comprehension of adults with learning disabilities. *Journal of Intellectual Disability Research*, 51 (7), 545-550.

Kay-Raining Bird, E. & Chapman, R. S. (1994). Sequential recall in individuals with Down syndrome. *Journal of speech and hearing research*, 37 (6), 1369–1380.

Kitzinger, A. (2013). METACOM 6. Symbolsystem zur Unterstützten Kommunikation. <http://www.metacom-symbole.de/>

Niegemann, H. M., Domagk, S., Hessel, S., Hein, A., Hupfer, M. & Zobel, A. (2008). *Kompendium Multimediales Lernen* (X.media.press). Berlin: Springer.

Poncelas, A. & Murphy, G. (2007). Accessible Information for People with Intellectual Disabilities: Do Symbols Really Help? *Journal of Applied Research in Intellectual Disabilities*, 20 (5), 466–474.

Wilkinson, K. M. & Snell, J. (2011). Facilitating Children's Ability to Distinguish Symbols for Emotions: The Effects of Background Color Cues and Spatial Arrangement of Symbols on Accuracy and Speed of Search. *American Journal of Speech-Language Pathology*, 20 (4), 288–301.