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Jakonen, Teppo – Szabó, Tamás Péter – Fenyvesi, Kristóf. 2021. Geometrical perception as social, interactional and embodied action. *The Finnish Journal of Education* 52 (1), 7–21.

Recent research on the learning of science and mathematics, and more specifically on STEM education (science, technology, engineering and mathematics), emphasises the close relationship between the human body and cognition. In this article, we explore some ways in which geometrical perception constitutes, and is displayed in, social, interactive, and materially-mediated embodied action. We draw on ethnomethodological conversation analysis to investigate video materials that were collected in a mathematics workshop organised outside school. In the workshop, pairs of primary school pupils were given the task of constructing a geometrical representation of a football using the plastic tubes and connectors of a 4DFrame construction set, a tool developed for mathematics education. By way of a conversation analytic case study, we show how during such a guided replication task, touching and pointing offer important interactional resources to participants for perceiving their emerging football construction, noticing problems in its geometrical structure as well as visualising existing and planned structures to others. We argue that embodied visualisations of the football structure enable the workshop instructor to guide and support the pupils' emerging geometrical perception. In all, our analysis highlights the multisensory nature of geometrical perception and its dual role in the workshop as both an institutional learning object and a prerequisite for being able to build a geometric model of football. More broadly, our results support earlier studies that foreground the role of the human body, learning materials, and interaction in teaching and learning activities.

Descriptors: perception, mathematics, embodied learning, hands-on workshops, conversation analysis

Koivuhovi, Satu – Vainikainen, Mari-Pauliina – Kalalahti, Mira. 2021. The development of students' mathematical thinking skills and mathematical self-concept in classes with and without a special emphasis from fourth to sixth grade. *The Finnish Journal of Education* 52 (1), 22–36.

In this article, we explore how academic self-concept in math and pupils' mathematical thinking skills develop from Grades four to six in classes with ($n=225$) and without ($n=664$) a special emphasis and whether possible differences could be explained by a selection process into classes with a special emphasis. In addition, we examined peer effects Big-Fish-Little-Pond-Effect (BFLPE), Reflected Glory-Effect (RGE) and Peer Spillover-Effect (PSE). The data were analysed with structural equation models. Classes with and without a special emphasis differed from each other in terms of mathematical self-concept and mathematical thinking skills, but all differences were explained with selection process, i.e. differences in background variables (gender and mother's education level). Mathematical self-concept declined from Grade 4 to Grade 6 in both class types. Pupils' mathematical thinking skills developed as expected from the fourth to the sixth grade in both class types, and studying in a class with a special emphasis did not boost children's mathematical thinking skills. On the contrary, analyses of the examined peer effects gave evidence of BFLPE indicating that studying in a highly achieving peer group may have detrimental effects on academic self-concept. The other

examined peer effects, RGE and PSE, were not visible in our data. Interesting gender differences were found between different class types, which should be studied more closely in the future.

Descriptors: classes with a special emphasis, mathematical self-concept, mathematical thinking skills, peer effects

Atjonen, Päivi – Oinas, Sanna – Ahtiainen, Raisa. 2021. Feedback as a part of formative assessment: Dialogue or monologue? The Finnish Journal of Education 52 (1), 37–50.

This study investigated the feedback pupils receive from their teachers in Finnish basic education. Feedback was conceptualised as an interactive process that is one part of formative assessment and an effective means for supporting learning. In this study, the feedback was approached from the perspectives of strategies, contents, and targets. The data consisted of group interviews of fifth- and sixth-graders (N = 62), and of sixth graders' (N = 1876) answers to open-ended questions of an electronic questionnaire. The results imply that feedback was often targeted to self-regulation. Moreover, feedback was perceived as person-targeted, although there is no research-based evidence that this type of feedback would enhance learning. Feedback was connected to engagement in learning and the perceived importance of assessment. Instead of being involved in a dialogical process, pupils often described themselves as passive receivers of feedback, especially when the feedback was delivered digitally. This study provides important information for the topical national development work on formative assessment in basic education.

Descriptors: feedback, formative assessment, dialogue

Orell, Miina – Pihlaja, Päivi. 2021. Cooperation between home and school in teacher's speech. The Finnish Journal of Education 52 (1), 51–64.

This study examines teachers' speech about cooperation between home and school, and what kind of meanings the cooperation receives in their speech. Altogether 13 teachers from two districts were interviewed, and the data were analysed using inductive thematic coding. Three areas of speech were identified and named as speech about cooperative actions, families, and cooperative skills. Closer analysis revealed that teachers' speech varied in these areas and it was possible to identify different roles of action for the teachers. Through these roles of action, the cooperation between home and school was seen either as an obligation, an opportunity offered to homes or as searching mutual understanding. The search for mutual understanding was recognised as the ideal for cooperation between school and home. To reach this level, teachers needed critical self-reflection skills to recognise, reassess and modify their own beliefs and assumptions.

Descriptors: cooperation between home and school, thematic coding, teachers

Mustonen, Sanna – Puranen, Pauliina. 2021. Language aware practices supporting the engagement of students with immigrant background in vocational education. The Finnish Journal of Education 52 (1), 65–78.

In this article, we analyse pedagogical practices that support student engagement and integrated learning of language and content in vocational education. The team-based ethnographical interview and observation data were gathered in a vocational school during two school years. The key participants are seven young adults with an immigrant background. They all were late arrivals to the Finnish educational path. In addition, fourteen members of the teaching and study counselling staff were interviewed. The data were analysed using theory-driven content analysis. An ecological approach to language learning was applied to identify practices that support participation and integrated learning of language and content. The results indicate that in vocational education, linguistic support remains easily apart from the content studies. Conscious enhancement of interaction promotes engagement and learning the field-specific language. In the case of the key participants, different modes of language use were supported only scarcely, which weakened their chances for equal engagement in activities, access to practical training and further studies, and sometimes even school engagement. The participants' multilingualism is not supported in the studies either, but it seems nevertheless to be a valuable learning resource for them. The results of

this study can be applied in developing language aware vocational education and supervision practices.

Descriptors: vocational education and training, language aware teaching, migration, ethnography

Plamper, Raakel – Jauhiainen, Arto. 2021. Students as customers of higher education – literature review. *The Finnish Journal of Education* 52 (1), 79–94.

The market-oriented higher education positions educational institutions as if companies, teachers as customer service staff and students as customers. In this descriptive narrative literature review, we investigate how student's position as a customer is defined and how it is argued for and against in international educational, sociological and economic research literature (54 articles and chapters). The data were analysed by means of theory-directed content analysis. The results show that the customer role of students positions them as 1) rational actors who invest in education, 2) rights-aware consumers of services, 3) determiners of educational quality, and 4) co-producers of education. Ideally, the customer position of students is expected to empower and activate them, but according to critical views, it instead positions students as passive receivers of their education.

Descriptors: higher education, students, marketisation, customer, consumerism