Abstracts 7th International Designs for Learning conference

Remediation of Learning

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Keynote speakers

Jay David Bolter, Georgia Institute of Technology

Jay David Bolter is the Wesley Chair of New Media at the Georgia Institute of Technology. In addition to writing about new media, Bolter collaborates in the construction of new digital media forms. Bolter is now a co-Director of the Augmented Environments Lab and works closely with Prof. Blair MacIntyre, Prof. Maria Engberg on the design of augmented and mixed reality experiences for cultural heritage, informal education, and expression and entertainment. He is currently working on two books: one on popular culture and digital media and the other on AR and VR (jointly authored with MacIntyre and Engberg).

Learning in the Digital Plenitude: What has changed?

For hundreds of years, education has been defined by and through the medium of the printed book. Since the 19th century, a series of new media have been introduced (photography, film, sound recording, and television), but their impact on educational practices has been limited. In contrast, the computer and associated multimodal technologies have been relatively rapidly integrated into the formal educational process. Digital technologies now play a central role in the storage, distribution and presentation of vast amounts of text, images, video and audio—in other words, most forms of knowledge representation. The question remains whether digital technologies are leading to significant, or merely superficial, changes in the way we communicate and learn? Is the textual paradigm in learning and education now finally being superseded?

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Professor Sanna Järvelä, University of Oulu, Finland

Sanna Järvelä is a professor in learning sciences and head of the Learning and Educational Technology Research Unit (LET) and director of the LeaF research infrastructure in the University of Oulu. Her main research interests deal with self-regulated learning, computer supported collaborative learning and on-line learning processes. Järvelä and her research group is internationally recognized in theoretical and methodological advancement of social aspects of selfregulated learning (socially shared regulation in learning) and processes oriented and multimodal research methods. She has published more than 150 scientific papers in international refereed journals and about 50 book chapters and three edited books, she has 9507 citations in Google Scholar and her h-index is 52. Järvelä is the member of the Finnish Academy of Science and Letters, the past EARLI (European Association for Research on Learning and Instruction) president and invited member of the expert group of the OECD's PISA 2024 'Learning in the Digital World'.

Using multimodal data to understand and design for learning

Advanced learning technologies have contributed to progress in research learning sciences. There is a growing interest in methodological developments using technological tools and multimodal methods in understanding learning process (e.g. physiological measures). We have been working for multimodal and multichannel data for collecting and understanding complex interaction of cognition, motivation and emotion in regulation of learning. We have been especially interested in how groups, and individuals in groups, can be supported to engage in, sustain, and productively regulate collaborative processes for better learning. In this presentation, I will introduce the theoretical progress of research on regulated learning, review our recent empirical findings of regulated learning in computer-supported collaborative learning context and discuss practical learning design implications of this line of research.

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Theo van Leeuwen, University of Southern Denmark and

Theo van Leeuwen is Professor of Language and Communication at the University of Southern Denmark and Emeritus Professor at the University of Technology, Sydney. He studied film scriptwriting and direction at the Netherlands Film Academy in Amsterdam and worked as a film and television director in the Netherlands and in Australia. In Australia, he studied linguistics at Macquarie University and took his PhD at the University of Sydney. He has held academic positions at Macquarie University, The University of the Arts, London, Cardiff University, the University of Technology, Sydney (where he was Dean of the Faculty of Arts and Social Sciences from 2005 to 2013) and the University of Southern Denmark.

He has published widely in the area of visual communication, multimodality and critical discourse analysis and was a founding editor of the journals Social Semiotics and Visual Communication. His most recent books are The Language of Colour, Voice – Vocal Aesthetics in Digital Arts and Media (with N. Neumark and R. Gibson), and Visual and Multimodal Research in Organization and Management Studies (with M. Höllerer, D. Jancsary and R. Meyer). In 2007 he was elected as a Fellow of the Australian Academy of the Humanities.

Staffan Selander, Stockholm University, Sweden

Staffan Selander is PhD and professor emeritus in Didactic Science at the Department of Computer and Systems Sciences, Stockholm University (SU). During the last 10 years, he has focused on designs for and in learning, multi-modal knowledge representations, and digital learning environments. He has been leading several external, international research projects, and has also been engaged in smaller, community based developmental projects.

In 1990, Selander took the initiative to organize IARTEM – the International Association for Research on Textbooks and Educational Media - <u>https://iartemblog.wordpress.com</u>, and in 2008 the e-journal Designs for Learning - <u>www.designsforlearning.nu</u>. He has tutored 45 doctoral students and 20 licentiate students.

Multimodality and Designs for Learning

Multimodal literacy is, today, a requirement for people working in a wide range of sectors, and no longer a specialist skill for photographers, designers, journalists and other professionals. However, multimodal literacy is also about engaging critically and personally with texts and experimenting and innovating with text production.

Social semiotic approaches to multimodality focus on researching resources for meaning-making and their social histories, as well as the ways these resources are used in specific historical, cultural and institutional contexts, and the ways people talk about them in these contexts – plan them, teach them, justify them, critique them, etc.

Designs for Learning developed as a research perspective in close relation to both social semiotic and multimodal research, paying attention to multimodal ways of meaning-making as well as more overarching questions concerning social institutions and the stratification of societies. Designs for Learning relate to (multimodal and multi-medial) in terms of knowledge representations, new ways of recognizing "signs of learning", and in terms of designs "in" and "for" learning.

In our presentation, we will outline these two perspectives – multimodal social semiotic thinking, and design-oriented thinking – in relation to learning and future education. After this, we will start a dialogue about the concepts and ways of thinking that are central to the two perspectives, and anchoring this discussion in joint projects concerning textbooks and toys as communication.

Design för lärande – Historia. Medeltiden som exempel (Insulander, Lindstrand & Selander, 2019. Studentlitteratur).

Learning resources at stake (with S.V. Knudsen; in Rodríguez, Garcia & Bruillard: IARTEM 19991– 2016. 25 Years Developing Textbook and Educational Media Research, 2019).

Dybde/læring – en flerfaglig, relasjonell og skapende tilnærming (Østern, Dahl, Strømme, Petersen, Østern og Selander – Eds, 2019, Universitetsforlaget).

Games and Education: Designs in and for learning. (Arnseth, Hanghøj, Henriksen, Misfeldt, Ramberg & Selander – Eds, 2018. Brill/Sense).

Abstracts:

Paper sessions and Master class

Disciplinary and Pedagogical Affordance

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Keywords: affordance, multimodality, pedagogical affordance, disciplinary affordance, semiotic resources, higher education, disciplinary learning

Ever since Gibson introduced the concept of affordance in 1979 it has been an area for discussion and disagreement. Most famous, perhaps is the quarrel between Gibson and Norman (1988) about whether affordances are inherent properties of objects, or occur only when they are perceived by an organism. More recently, the concept of affordance has been used in educational settings. Here, Kress et al (2001) have claimed that different semiotic resources have different specialized affordances for teaching and learning.

In this respect, the interrelated constructs of disciplinary affordance and pedagogical affordance (Airey 2015) have been shown to be useful for problematizing learning in higher education settings. Both of these constructs make a radical break with the views of both Gibson and Norman in that rather than focusing on the perception of a single individual, they refer to the disciplinary community as a whole. Disciplinary affordance is defined as the agreed meaning making functions that a semiotic resource fulfils for a disciplinary community. Whereas pedagogical affordance is defined as the aptness of a semiotic resource for the teaching and learning of some particular educational content (see Airey 2015; Airey & Linder 2017 and Airey & Eriksson 2019). In this characterization, disciplinary learning itself can be seen as a process through which students come to experience disciplinary-specific semiotic resources in a way that corresponds to their disciplinary affordance i.e. learning can be framed in terms of coming to understand how resources are expected to be interpreted and used by the discipline.

In this paper I will briefly discuss the history of the term affordance, define the terms disciplinary affordance and pedagogical affordance and illustrate their usefulness in a number of educational settings.

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Developing Student Representational Competence: The Case of Graphs

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Keywords: Representational competence, Graphs, Science teaching and learning, Semiotic resources

In order to make disciplinary meanings, science students need to coordinate a large number of semiotic systems such as graphs, diagrams, spoken and written language, gesture, mathematics, etc. In this respect, it has been suggested that there is a critical constellation of semiotic resources that is necessary for holistic construction of each scientific concept (Airey, 2009). Other actors have discussed this problem in terms of building students' representational competence (Kozma & Russell 2005; Kohl & Finkelstein 2005; De Cock 2012; Linder et al. 2014). Combining this work, Volkwyn et al (2020:91) define representational competence as: "The ability to appropriately interpret and produce a set of disciplinary-accepted representations of real-world phenomena and link these to formalized scientific concepts". In this paper we first put forward a theoretical proposal for how such student representational competence may be developed, before empirically demonstrating the usefulness of this proposal for a particular representational system (graphs) in a particular area of physics (1-D kinematics). By coordinating kinematics concepts, the three graphs, and real-world movement we show how the students begin to practice their representational competence. We also show the complexity of this apparently simple system in representational terms.

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Dilemmas in computer game assisted dialogues for persons with communication disorders

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Keywords: acquired brain injuries, aphasia, argumentation, communicative participation, computer games, dialogues, Unity

From 2019 to 2021 we conduct the multidisciplinary research project When words fail: advanced communication through digital innovation for persons with aphasia, with support from Vinnova. The project's aim is to develop a prototype for a mobile application, Dialogica, to support communicative participation for persons with acquired brain injuries and aphasia when joining conversations about deep, personally relevant, and contestable issues. Millions of people each year acquire a brain injury (Colantonio et al., 2016), for instance through stroke or car accidents. The consequences are diverse and may show in the communicative, cognitive, social, emotional, or vocational domains (Cancelliere et al., 2014; Colantonio et al., 2016; Durham, 2012; Fabiano & Sharrad, 2017; Sabatello, 2014, Soeker, 2016). Aphasia – defined as "a loss or impairment of verbal communication, which occurs as a consequence of brain dysfunction" - is one common consequence in the communicative domain (Brady et al., 2016, p. 79). It often means long-term communicative changes with severe influence over engagement in activities and maintenance of relationships (Lanyon, Rose, & Worrall, 2013). To achieve communicative support for persons with aphasia, we bring together expertise in computer game technology, education, special needs education, and philosophy. Together with end users we develop the application and test its effectiveness. In this paper, we (i) provide an overview of the theoretical background and the development hitherto, and (ii) discuss issues or dilemmas relating to the app and the fulfilment of its purpose.

In short, Dialogica is an application developed through the game development engine Unity, designed for mobile devices with larger screens, and is based on computer game technology, theory in dialogic education, and argumentation theory. The main usage of the app is when the participants are in the same physical room and it is then intended to support participants in expressing themselves in different virtual environments through personal avatars, animations and chats. Dialogica allows for conversations' argumentative structures to be represented visually through so-called "conversation trees". In order to support participants with verbal language loss, the app also incorporates a text-to-speech function.

The project depends on close collaboration with end users, with which iterated workshops and facilitated dialogues using prototypes will be conducted. Through these workshops, we receive feedback used for further development of the prototype. In the end stage of the project, we will compare dialogues with and without Dialogica using an adapted version of the structured observational scale called the Argumentation Tool (Reznitskaya & Wilkinson, 2017), in order to measure the extent to which the application facilitates communicative participation for the

participants. However, because of the pandemic, we have not yet been able to test the prototypes developed so far. Other issues that we will attend to in greater length in this paper is the level of applicability of the app in settings others than dialogues facilitated by experienced facilitators, how the app could support the participants' awareness of improvements in communicative participation, and possible threats to internal validity when using the final app in experimental studies.

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Emerging practices and persisting challenges - a year into distance education in upper secondary school

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Keywords: upper secondary school, covid-19, distance education, emergency remote teaching

In Sweden, upper secondary school teachers made a swift transition into distance education due to the outbreak of covid-19 in March 2020. While many reports have surveyed the initial shift, little is known of emerging practices and persisting challenges a year after the outbreak. This design-based research intervention designed for professional development using an adaptation of the Blended Learning framework. Twenty-six teachers participated in the intervention for professional development which spanned six months. The teachers were encouraged to develop their teaching practices in blended and online learning. Teachers collaboratively planned and subsequently reflected on their teaching. In this intervention, a step-by-step approach was undertaken, in which stakeholders were asked suggestions of modes of delivery, content, design and level of participation. In the end, the APD intervention included in-person and hybrid workshops, adoption of technologies in their practices, online webinar with all teachers, final online seminar with lead teachers. Workshops, dialogues and the final seminar were analysed using thematic analysis. Key results revealed that some teachers were still struggling with delivering and managing online classes a year into distance education. However, several innovative practices emerged, such as inviting special needs teachers in the online class to work with all students in need, dividing students into groups based on knowledge and aspiration to personalise learning, and starting to explore virtual laboratories. Findings also show that some challenges in physical classroom became more visible in online classrooms, such as students arriving late for class or talking out of turn. Other challenges arouse as a result of the shift into distance education: such as new ethical considerations when digital technologies capture a student's home and others who live there, or when students chose to attend class while driving or working, and new ways of cheating. While teachers report that a substantial number of students benefit from distance education, they also report struggling to reach students with avoidance behaviour. In relation to the intervention, key findings suggest that parallel purposes can accommodate both stakeholder priorities and research purpose and ensure a transfer of ownership of online collaborative learning. Conclusively, the past year has meant a leap forward for many, but not all, teachers. It can be questioned to what extent there is a more significant gap than ever before between teachers and their IT practices. Second, challenges that may have been previously overlooked can become more apparent when education moves online which in turn may trigger a need for an educational response. The experiences of emerging practices indicate that striving to return to previous practices, may not be the optimal goal for schools: teacher's professional development and new experiences have elicited new practices that may benefit teacher practices, and students after the pandemic. Professional development during uncertain times and design principles that support the transfer of intervention ownership are discussed.

Transfer of Expert Knowledge with Case-Based Reasoning for Selfremediation - User-driven innovation in continuous professional development

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Keywords: Expert Knowledge, Case-Based Reasoning, Self-remediation, User-driven Innovation, Design Thinking, Service Design

With constant access to instructions, shared knowledge, and threaded forums we are getting used to solve problems by finding a similar case or relevant demonstrations. On a higher proficiency level, we need to embrace complexity from values and assumptions in a specific context. An expert has a specialised knowledge set based on internalized experience from several occasions and are immersed in a specific domain of knowledge. The City of Stockholm is working on solution to transfer expert knowledge in our organisation with the use of case-based reasoning (CBR)

Aim: The ambition for City of Stockholm is to become the world's smartest city by 2040 and to make social development sustainable with support from digitalization and new technologies. For the education sector one goal is to achieve "Improved use of digital tools in education, allowing for better education". One approach in our organisation is to make sure competent IT-coordinators (ITKP) can support school leaders and teachers. This will result in an e-learning solution to allow self-remediation for our members.

Research setting: The number of teachers employed in City of Stockholm are estimated to 8300 and the municipal assembly has decided that IT-controllers working in the team IT service and coordination at the ICT-unit should facilitate knowledge transfer to the local IT-coordinators at approximately 780 schools. In 2018 Fujitsu was awarded a contract by City of Stockholm to deliver Digital Workplace Services and its Service Desk solution for approximately 140 000 students as and teachers. This project is known as "next-generation IT services". We used the LIKA 4.0 matrix, developed by Swedish Association of Local Authorities and Regions (SALAR), for evaluating the structural implementation of ICT. The change of IT environment created a major disruption of the indicators for infrastructure in the LIKA survey.

Main results: The strategy to transfer expert knowledge was limited to task decomposition of the expectation to be "responsible for the local support of our students and our staff regarding computers and other technical equipment". We decided to create a knowledge sharing artifact using contextual branching scenarios in an e-learning course and has used the approach of assessment for learning (AFL) where the feedback is used to improve the user's performance. The branching-scenario element is used in our e-learning portal based on the Learning Management System (LMS) Totara Learn and is built with our content authoring tool Adapt Builder. The sharing of the application is handled as a SCORM-package in our training platform and has been combined with micro-credentials (i.e. Open Badges).

We have experimented with different solutions:

- Videoconferencing with an expert and virtual fieldtrip [1]
- Expert systems with virtual assistant and social robots [2]
- Visualizing learning processes with educational datamining [3]

The future research and development will address the implementation of user-driven innovation in continuous professional development. This will be done with design thinking/service design as a means to develop smart and innovative services in the public sector [4].

- [1] https://padlet.com/natbaserad/ngl2019
- [2] https://furhatrobotics.com/education/
- [3] https://www.eden-online.org/2020_lisbon/session/poster-session-3/
- [4] https://www.service-design-network.org/headlines/innovationsguiden-project-x

Discourse analysis in educational contexts

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Keywords: Discourse analysis, Educational science, Democracy education

The purpose of this presentation is to discuss an ongoing project about how to work with discourse analysis in educational contexts. The background is that we have been teaching several courses on different teacher programs for many years and our view is that critical analyses are clearly underrepresented even though teacher education's curricula and learning goals highlight a critical approach. Further, we have noted that there is no category for discourse studies in the database of Skolporten, where all Swedish dissertations in educational science are systematic collected.

We believe that studies in discourse theory and discourse analysis could play an important role because the discourse perspective can make inequality, injustice and abuse of power and populism in society visible as shown by well-known (critical) discourse researchers as Norman Fairclough (2015) and Teun van Dijk (2008). Studies in discourse analysis provide analytical tools for democracy work, which can challenge knowledge resistance and false knowledge, in order to focus on for instance gender equality, anti-racism and equality (see eg. Eilard in press, Wicke 2019, Dahl 2018, also see eg. in Wodak & Meyer eds. 2016 or in Rogers ed. 2011). They also provide students scientific abilities, such as accuracy, logical thinking and independence in contrast to a more instrumental approach (see eg. Rogers ed. 2011).

Our project will result in an anthology that can be used on teacher programs as well as in other educational studies. We will discuss some of the articles in the anthology and how they, in different ways, apply discourse analysis in concrete analysis that are relevant to teacher students – from start to finish. With this anthology, we want to broaden the students' theoretical and methodological skills, which is necessary according to the goals formulated by Swedish national agency for higher education. Our hope is that students will learn how to use a discourse analytical approach in a variety of relevant contexts and develop a pedagogy, who are interested in how language, power and identity interact in society in different ways.

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"The molecules moved much much much much faster". Young learners create digital stop motion animations to represent abstract content

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Keywords: Designs for learning, Student generated animations, Multimodal analysis, Thematic patterns, Science education

Research has shown that teaching about and learning the particle model in chemistry is challenging (e.g. Gilbert & Treagust, 2009). In an interdisciplinary developmental and research project (Hultén et al., 2020), we seeked to find ways of overcoming this challenge. One didactic idea was to let students develop their own tentative models over a series of lessons and to finally create digital stop motion-films to – by using the particle model – describe and explain a puzzling phenomenon: why does a balloon that you place on top of a frozen glass bottle expand in room temperature? Data in the present study comprise video recordings from the lessons and photographs of texts, including students' final stop motion films. A general analysis of the teaching and learning design was made inspired by the 'LearningDesignSequences' model (e.g. Selander, 2008, 2017). The texts were then analyzed multimodally based on Lemke's (1990) notion of thematic patterns. As the texts were created by the use of various tools for text creation (e.g. pens, crayons, plasticine clay, stop motion application) and comprised a variety of modes (still and moving image, writing, speech), the study also draws on principles for distinguishing and analyzing the affordances and use of different tools and modes (e.g. Kress, 2010). This analysis especially concerned the affordances for representing different aspects of the particle model.

The analyses reveal that through a teaching and learning design in which students had the opportunity to represent and re-represent their ideas about the particle model, these young students showed that they were capable of representing valid models in a subject area which have been proven challenging even for grown up students. The results are discussed in relation to the implications for education concerning the use of digital tools when working with highly abstract phenomena.

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Developing a Multimodal Pedagogical Model for Science Education of Gifted and Talented Students: The Multi-Semiotic Approach

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Keywords: Multimodality, Social semiotics, Gifted Education, Science Education

Many studies (e.g. Dai, 2011) in the field of gifted and talented education demonstrated that gifted students have a high degree of design capabilities in their own learning paths. Literature implies that further reserachers are necessary to investigate didactical strategies for gifted learners (e.g. Turkish Ministery of Education, 2019). This study aims to develop a pedagogical model for science education of middle school level gifted and talented students. Many studies claimed that learning can be seen as design and pedagogy can be seen as a design process (e.g. Jewitt, 2008). Social semiotics, multimodality (Kress, 2010), and Cattle-Horn-Carroll theory of intelligence and cognitive abilities (Schneider and McGrew, 2012) inform theoretical and conceptual framework of the study. Drawing on mentioned theoretical frameworks and the studies of The New London Group (1996), Selander (2008), Waldrip, Prain, and Hand (2010), and Andersen and Munksby (2018), the study aims to design and develop a multimodal pedagogic model in order to improve representation competency skills (design skills) of teachers and students in middle school level. As the study aims to designing and developing a didactical model, design based reserach (DBR) (McKenney and Reeves, 2012) was chosen as methodological framework. DBR intends to define problems, design and develop solution model. The study is being executed in three phases in accordance with DBR. The first phase involves survey of literature, determining problems, designing draft design principles and draft intervention pedagogic model informed by theoretical bases mentioned above. Second phase is higly interventionist that involves design experiments in iterative manners. Third phase includes evaluation in a retrospective perspective. As of now, this study has completed the first phase and intending to implement the second phase as iterative cycles of implement-evalute-design logic.

Data in DBR will be collected in multi-stages to obtain from all stakeholders including experts, practitioners, and students. Data will be collected via video, audio records, open-ended interviews, field data through ethnographic observations based on multimodality, and teacher and learner generated artefacts. All those data will be analyzed by using different analytical frameworks. The former is about the measures of effective multimodal representations developed by Keles (2016). The latter framework is about non-verbal communication tools such as gestures, body language, and space-movement analysis (Victor, 2011). The third framework is improved by Tang, Won, and Treagust (2019). They present the development, description, application, and discussion of an analytical framework to examine students' drawings of scientific concepts and processes. The forth one is constructed by Tippett (2011) in order to analyze metafunctions (meanings) of pictures. The last one is designed by Daly and Unsworth (2011). They concerned about investigation of student comprehension of image language relations in multimodal texts, using a framework developed from systemic functional linguistics. Data will be collected and analyzed.

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Knowledge representation and subject matter in digital multimodal student products

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Keywords: Knowledge representation, Learning design, Digital multimodal products, Student assessment, Design-based research

In recent years, the focus of the educational debate on digital literacy has shifted from a broad interest in digital communicative and meaning making practices (Cope & Kalantzis, 2009; Kress, 2010; Bezemer, 2016) to a more specific focus on computational thinking (Denning & Tedre, 2019; Wing, 2006) and digital fabrication (Marshall & Harron, 2018; Resnick, 2017; Smith, 2018). This movement brings changes to the classroom, both in the form of new technologies (e.g. robots and Micro:bits), but also in the form of new practices (e.g. programming) and new forms of knowledge representations and student products (e.g. scripts and complex multimodal digital products). Consequently, existing views of assessment of students' performance and quality in students' products are challenged (Cope & Kalantzis, 2017; Fraillon, 2019).

In this paper, we focus on the assessment of digital multimodal student products. Following Selander (2008), we see learning as a transformation process. The digital multimodal student products are the resulting output of a primary transformation unit and, thus, represent the process of transforming subject matter content into knowledge and competences through the design of multimodal digital products. We present findings from a design based research project (Barab & Squire, 2004) focusing on coding across subjects in a Danish lower secondary school context. The purpose of the project is to support teachers in developing learning designs that integrate coding across the subjects Danish, Science and Technology, and Crafts and Design. As part of the project, we aim to understand how subject matter knowledge is represented in digital multimodal student products and how these new types of student products can be assessed. In this paper, we address the following research question: How is subject matter content represented in complex digital multimodal student products? How can complex digital multimodal student products be assessed with respect to student progression?

We collected student products in the form of digital stories and models created using the blockbased visual programming language Scratch (www.scratch.mit.edu). In addition, we performed interviews with students while they were walking us through their digital projects. The student products were analyzed in terms of subject matter content, multimodal complexity and code complexity (Jewitt, 2014; Shah, 2017) while the interviews provided insight into the digital design process.

Our main findings suggest that designing digital multimodal products provides students with rich opportunities of actively transforming subject matter content into knowledge representations. However, our analysis also suggests that these new forms of knowledge representation present the teacher with several challenges: Is the learning outcome of these processes better than the outcome of teaching sequences based on traditional literacy teaching such as written essays? How can

students' stereotypical use of signs when choosing pictures and sounds be qualified through learning designs?

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Multimodal Assessment in Higher Education: recognizing learning in multimodal texts

PhD Masterclass

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Keywords: assessment, evaluation, multimodal method, multimodal text, recognition

In blended learning environments in higher education, students increasingly represent their learning and knowledge through multimodal and digital text-making, combining forms such as writing, film, still and moving images. These changes in the means and modes for students to design representations, entail changes in how to understand, recognise and evaluate the learning and knowledge expressed in multimodal text. Consequently, educational practices are under reconsideration as the ways and possibilities for communicating and representing knowledge change and expand to encompass new modes and media (Jewitt, 2014a; Kress, 2010). It is increasingly argued that assessment practices need to be better aligned with these new possibilities for students to communicate and express themselves (Archer, 2011; Carpenter, 2009; Jewitt, 2005; Matthewman, Blight & Davies, 2004; Miller, Knips & Goss, 2013). Despite previous research on multimodal communication and text-making in digital environments, there remains a need for further research into multimodal assessment to understand the gains and losses of this shift. This presentation will outline my ongoing doctoral study into multimodal text-making in higher education. Data is being collected from different courses in a Swedish university across a range of subjects, English, Health, Business, and Media. A multimodal social semiotic framework (Kress, 2009, 2010; Kress & van Leeuwen 1996/2006) is adopted to provide tools for studying multimodal texts (written, spoken, visual, gestural) with a focus on representation. Preliminary results from the pilot study indicate common points of reference for quality in multimodal text as evidenced across data sets in various subject domains. Among the key findings indicate tensions between explicit and implicit norms that governs the teachers recognition and evaluation of multimodal texts. As the tools, modes and means for expression and communication are changing rapidly, the methodological frameworks for studying these changing landscapes also develop and evolve to keep pace with the changing objects and areas of study. The increasing levels of modal complexity in multimodal texts requires increasingly complex multimodal transcription which is time consuming and with is a risk of over-focusing on description. Improved methods and tools for facilitating multimodal transcription and analyses would be profitable and will be explored as part of this presentation. In addition to its substantive contribution to understandings of multimodal assessment, this research project also therefore seeks to develop multimodal methods for studying complex digital representations of knowledge.

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The visual idea process and digital peer feedback: a study in the subject Art

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Keywords: subject art, visual idea process, digital peer feedback

In craft dominated subjects, such as art, the visual idea process is an important ingredient in a project. By visualizing the idea process and providing peer feedback, students can be made more aware of their own and others' visual idea processes (Butler & Winne, 1995) (Rollinson, 2005) (Anker-Hansen & Andrée, 2019) (Liu & Carless, 2006).

This study aims to explore how students develop and share visual ideas supported by digital peer feedback. It is expected to contribute to a deeper understanding of how to work with digital peer feedback in the visual idea process, and how the feedback is used by students. The study was conducted in a secondary school with eighth-grade students in three classes. Thematic analysis was used to identify different types of feedback and how the feedback was used by students (Braun, Clarke, & V, 2008). A qualitative survey was used to collect data on student perceptions. The assigned task in the subject Art was "to compose a photo of objects representing yourself". One star and one wish were used as feedback method on the visual ideas. In both categories, wish and star, different types of feedback appeared: foreground, middle ground and background, articulateness, the arrangement of objects in the picture, the choice of objects, light source, and the perspective. In the category, star, compliments for the content, and the choice of color were added. The survey showed that many students appreciated receiving feedback from peers and felt that the feedback helped them to improve their design. The received feedback made them think from another perspective. A few thought that the feedback was unclear and not useful. The feedback made them insecure and doubtful. In giving feedback, many students experienced that they got inspired, which was useful in their design. They had a positive feeling of helping peers to develop their ideas, by sharing their thoughts and opinions about the work. Some students found giving feedback hard work and they also worried if the receiver would take the critique wrong and become sad about it.

The possibility to study all design suggestions from other students was appreciated. The students found the anonymity in the virtual room, using the digital space, beneficial. However, some thought that looking at other idea suggestions made them feel their idea was not enough. Many students articulated and manifested their final product, the photography, more than in the first draft. Some objects changed position for a better angle of the picture, others became abandoned or new were added.

Overall, the students thought that using digital peer feedback in the idea process was rewarding. It made the process more flexible and in so prevented design fixation (Schut, Klapwijk, Gielen, van Doorn, & de Vries, 2019). Also, in sharing of the idea work, the students perceived they inspired others, got inspired, and drove each other in the creative process.

The role of digital tools in assessment of multimodal texts

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Keywords: Assessment practices, Multimodality, Digital tools, Multimodal composing, iPad

The creation of multimodal compositions is an important part of composing practices outside of school, and it is gradually increasing as a literacy practice in schools (Magnusson & Godhe, 2019). During the last five years Bærum municipality has implemented the one-to-one model, having provided all pupils (17 000 in total) their own digital device (iPad). New literacy practices have emerged as the pupils produce a wide range of different multimodal texts.

Few studies have scrutinized how teachers' formative assessment practices are carried out in settings where students engage with multimodal composing and there is a lack of studies investigating the role of digital tools in teachers' formative assessment of multimodal texts (Author 1 & Author 2, 2019). Moreover, previous research findings indicate that teachers appear to lack both the experience with multimodal texts and the research-based knowledge required to assess these texts (Aagaard & Lund, 2013). Previous research also suggests that these multimodal texts play an important part in teachers' facilitation of pupils' learning and as a tool for formative assessment. One study found that pupils engaged longer with multimodal feedback compared to traditional written feedback. In addition, the feedback tended to be richer since it contained both verbal and non-verbal information (Campell & Feldmann, 2017).

This presentation starts out with an overview of previous research on the crossroad between multimodality and assessment. In our empirical investigation we combine interactional data, documents from assessment practices and students' multimodal texts from a large ongoing research and innovation project on multimodality and assessment. By analysing data of how teachers give feedback to their pupils, we aim to investigate what role the diverse software has in this process. We examine feedback practices based on the following overarching research question: How do teachers use the affordances of digital tools in their formative assessment of multimodal texts?

Our preliminary findings suggest that the digital ecology scaffolds the formative assessment process. The scaffolding takes place during face-to-face assessments, but the feedback also has a longer supporting effect since it is available for students through different audio and video recordings made by the teacher.

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Newly arrived students' interaction and communication in sloyd classrooms

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Keywords: slöjd/sloyd, newly arrived students, multimodality

In recent years, education for newly arrived students and how to organize their education has been a challenge for municipalities in Sweden (Bunar, 2015; Nilsson Folke, 2017). A common way to organize newly arrived students' education has been through introductory classes in primary school and while attending there, newly arrived students also take part in so called practical aesthetic subjects, such as school subject sloyd. An argument for this organization has been that so called practical aesthetic subjects does not require difficult verbal language, hence there are other resources for communication and interaction beyond verbal language. But classroom research concerning how newly arrived students and sloyd teachers communicate and interact are limited.

The purpose with my ongoing PhD project is to identify and describe how newly arrived students meet multimodal resources in school subject sloyd. Further I wish to explore and describe how newly arrived students and sloyd teachers use multimodal resources in sloyd classrooms.

In this presentation I wish to discuss my ongoing PhD project concerning newly arrived students and sloyd teachers which is framed by a sociocultural and multimodal perspective (Kress, 2010; Kress et. al., 2001; Vygotskij, 2000; Vygotsky, 1978, 1986). The methodological approach in my PhD thesis is based on video recordings. Empirical data has been collected in two schools, in year 8–9 in an educational sloyd classroom setting during a period of 14 weeks. I used one hand held camera in order to be able to follow the teachers and the students. Sloyd classrooms can be designed in different ways. There are often separate rooms for painting, sewing machines, metallic work and so on. By using a hand held camera it made it possible for me to follow both students and teachers around the classroom and follow their movement, communication and interaction up close. Main results show that newly arrived students and sloyd teachers has a rich multimodal usage where they can interact and communicate in several different ways, beyond verbal language and mediate meaning with different resources, i. e. tools, materials, gaze, touch, etc. Also, sloyd specific notions is being made concrete in interaction between teachers and students. Hence, the study highlights how rich available multimodal resources in sloyd classroom can be used by newly arrived students and sloyd teachers. Sloyd classrooms are subject specific, meaning it is a classroom that clearly signals what kind of actions that take place there. It is a situated practice (Lave & Wenger, 1991) where students can see, listen and attend other students' work. Further, the study raises questions about sloyd and multimodal actions and how sloyd teachers can be aware of how they use different multimodal actions in interaction and communication in sloyd teaching with newly arrived students. Also the study highlights sloyd classrooms rich resources at hand for students and teachers that can mediate meaning.

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The Lazy Netflix B – a case study on the use of humor and metaphors in teaching graphic facilitation

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Keywords: Graphic facilitation, Educational design, Visual ethnography, Teaching, Learning, Humor and playfulness

Graphic facilitation is a method that revolves around using multimodul representations in order to drive idea generation, learning processes, and collaboration among groups. The use of graphic facilitation is a growing practice in organizational contexts and is slowly emerging in educational contexts. However, there is a lack of research on the role of the facilitator when teaching graphic facilitation. The purpose of this paper is to explore how facilitators in graphic facilitation organize and materialize their teaching in order for the participants to gain practical skills and knowledge they can apply in their own work. In the beginning of graphic facilitation courses, facilitators are often met by enthusiastic participants who also hesitates and have disbelief in their own drawing skills. Thus, the paper aims to provide insights into didactical considerations of facilitators and the iterative process of developing educational designs that empower participants to gain confidence in their own drawing abilities as an entrance for using graphic facilitation.

The data used for analysis is based on participatory observations on two professional facilitators teaching basic 2-3 days courses in graphic facilitation. These observations are combined with follow up interviews discussing different didactical considerations focusing on involvement of participants, the use of analog and digital teaching materials and their own role as facilitators. As the observed teaching is multimodal, the research approach take a point of departure in visual ethnography and photo elicitation. Thus, observations are collected and documented through annotated drawings and photos used as dialogue tools in the follow up interviews.

The findings shows how humor and playfulness are significant teaching approaches in graphic facilitation as multimodal representations becomes humorous metaphors and manifestations of the collaborative group learning throughout the courses. Likewise, practice based exercises materialized in visual learning arenas are central elements, when facilitators visualize connections between the graphic facilitation course and the participants' work places. Based on the empirical findings, the paper concludes by outlining the teachers' didactical considerations and argumentations specific for teaching in graphic facilitation.

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Acting as Detectives while Reading Detective Stories – Remediating Literature Instruction

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Keywords: literature instruction, multimodal activities, embodiment

In line with many international studies, there has been a downward trend in literary reading among Swedish students in comprehensive school (Statens medieråd 2017). Even though PISA 2018 shows improvements in reading comprehension, the gap between "strong" and "weak" readers has increased (Skolverket 2019). The educational system faces a challenge in decreasing this gap and enhance reading engagement in order for all students to develop reading comprehension and skills as a democratic means.

This presentation is based on a literary reading project in grade 7, in a linguistically and culturally diverse comprehensive school in Sweden. The aim of the presentation is to illustrate how playful, multimodal activities and literature instruction from a corporeality perspective can be designed and how students' understanding of and engagement in the story may be expressed within such an embodied frame (cf. Hedman et al., in press). Theoretically, the study builds on a New Literacy tradition (Barton 2007; Heath1983), and a multimodal perspective (Jewitt 2006), as well as on Langer's (2011) theory of envisioning literature and reading literature in relation to corporeality (Elam & Widhe 2015; Fatheddine 2015; cf. Säljö 2000).

This research project can be described as process-oriented, where the researchers both planned and implemented certain teaching activities. The researchers thus altered between roles of participatory and observers. The aim of the staged teaching activities was, on the basis of a detective novel, to help the students concretize the reading of the literary novel through aesthetic methods, including embodiment of the reading. For example, the chosen novel was situated in the vicinity of the school, where most of the students lived. Activities were arranged to enable the students to predict and visualize what could happen in the story through the explorations of artefacts symbolizing different aspect of the crime committed in the story. The students also created a crime wall where they acted as detectives and linked possible clues in the text. These activities encouraged the students to engage in both point- of- reference and horizons- of- possibilities- thinking (Langer, 2017). Finally, the students wrote literary analyses on the novel.

The ethnographical material (pictures, field notes, recordings etc.) as well as students' writings show that the reading was concretized through the embodiment of the activities, which per se enabled students' deepened understanding of the novel. Several students showed engagement, among them "non-readers" while working with the activities related to the reading of the novel (cf. Hedman et al., in press). Findings thus indicate that the reading of literature in relation to corporeality, embodied

and multimodal activities, may support and engage students' comprehension of literary text (cf. Elam & Widhe, 2015).

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Educational spaces and learning environments in different learning contexts – central themes in research, in the light of COVID-19 pandemic

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Keywords: Educational space, Learning environments, Research review, Social semiotics, Affordance

Educational space as well as learning environments have been empirically explored and studied for some time. Regardless of differences in knowledge interest or methodological focus, previous research has emphasized the importance of physical space for meaning making and learning processes (eg. Dewey, 2001). The COVID-19 pandemic has had a severe impact on a number of educational institutions as many universities and schools closed their physical spaces and was forced to move their education on line. Having experienced these changes brings up a need to explore educational spaces and learning environments further. In relation to the demands of social distancing, there is now an urgent need to reflect upon and advance our understanding of relations between learning and space. We argue that the educational field could benefit from further and several attempts to explore these concepts.

Based on a research review of educational spaces and learning environments in relation to different institutional settings, our aim is to gain understanding of how use of these spaces and environments can be seen in the light of the ongoing COVID-19 pandemic. In our paper, we summarize existing research related to specific learning contexts – museums, early childhood education settings, schools and higher education settings. Based on the review of previous research, we then suggest an integrated framework that may be used as an analytical tool in empirical research regarding educational spaces and learning environments. The three themes flexibility, engagement and connectedness are central findings. The construction of the suggested framework is based on relevant research findings regarding the affordance of rooms (eg. Kress, 2010). The notion of affordance is helpful as we wish to investigate how resources are used in situated meaning-making and learning.

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Programming Didactics - Learning and Assessing Programming in Primary Education

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Keywords: programming, didactics, computational thinking

Technology and software is becoming pervasive in almost every aspect of life. Understanding how it works and how it can be used to solve problems is therefore of crucial importance. Programming has traditionally been considered a skill only relevant to a narrow group of IT professionals, however the current rate of digitalization where software plays an increasing role in our everyday life has changed this view. It is now argued that everyone needs computational thinking (Wing 2006), that is, general problem-solving skills based on computer science that allows computers to effectively be used in the process. On March 9, 2017 the Swedish government decided to introduce programming into the primary education from first grade starting no later than fall 2018. As a consequence, every math and technology teacher in Sweden will have to teach programming. Teaching programming to novices at secondary and university level has been studied rather extensively (Pears etal 2007). In comparison to the amount of research conducted at secondary and tertiary level, teaching and learning programming at lower levels of education is still a largely unexplored domain (Nouri etal 2018).

As programming is introduced at a large scale in primary education there is an urgent need for studying how this can be done in the best possible way. It is also of utmost importance that the effects are evaluated in a scientific manner to be able to make necessary adjustments for meeting the goals as efficiently and effectively as possible. In particular, there is a need for longitudinal studies, where long term effects on diverse groups can be investigated. The questions that arise are interdisciplinary in nature and require expertise in didactics and learning as well as in computer science.

This paper presents the Programming Didactics project. The purpose of the project is to investigate how students learn programming and how these competences can be assessed in order to provide scientifically grounded programming didactics for primary education. Concretely, we will conduct a longitudinal study of students programming in classroom settings and develop an assessment framework to be used in the longitudinal study for measuring students' programming competences. The study will allow us to better understand how students learn programming and what good teaching practices are. In the project researchers in didactics and computer science join forces to contribute together to the knowledge and to deepen the didactic understanding of programming in primary education.

We will give an overview of the project and the results achieved so far. The project has a very high potential to make a significant impact on the teaching of programming both nationally and

internationally as the project fills an important gap while many countries are introducing programming into their curricula.

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Systemizing the Verbal-Visual-Gestural Intersemiosis in TED Talks

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Keywords: intersemiosis, language, visual, gestural, TED Talks, Systemic Functional Theory

TED (Technology, Entertainment, Design) Talks, as a new online science popular genre, aims to disseminate creative ideas and have become a viral phenomenon. Researchers are interested in investigating its pedagogical application as well as linguistic features. However, little research attention has been given to the use of multimodal resources of TED talks. To address this lacuna, this paper reports on an exploratory study that draws from Halliday's Systemic Functional Theory to describe the ways and nature of meaning-making through the use of the semiotic modes of language, images, and gestures in TED Talks.

Informed by the previous approaches in systemizing the intersemiosis of language and images (Martinec & Salway, 2005; O' Halloran, 2008; Painter, Martin, & Unsworth, 2012), language and gesture (Goldin-Meadow & Butcher, 2003; Lim, 2019b; Muller, Ladewig, & Bressem, 2013), our paper proposes an adapted framework to describe the interplay of meanings across the intersemiosis of the three modes in TED Talks. In particular, the intersemiosis are categorised within two general groups of meaning relations: Meaning Convergence and Meaning Divergence. Meaning Convergence is sub-classified into Meaning Concurrence and Meaning Complementarity, in which the semiotic modes work together to reinforce, clarify, and vivify the ideas (Norris, 2004). Meaning Divergence is sub-classified into Meaning Deviation and Meaning Contradiction. The former often results in ambiguity in comprehension, while the latter is usually used to achieve sarcasm or humor.

This paper will introduce the adapted framework and illustrate the categories using examples from the analysis of a presenter's use of modes in a TED Talk. The findings are useful in that they could deepen our understanding of the mechanisms of the meaning construction through different semiotic modes of TED Talks. Moreover, the exploration of the semantic relations in the combination of the intersemiosis across three modes could address a gap in multimodal research studies. From a practice perspective, the findings are also helpful for the presenters to make use of these modes more aptly and fluently in the delivery of oral presentations.

What can COVID-19 teach us about climate change? A speculative objectoriented learning experiment

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Keywords: Speculative design, making, experiential learning, design fiction

Speculative Design is a design practice that seeks to ask questions and spark imagination by generating reflection and debate through the creation of objects and materialised ideas. Speculative Design has been a widely discussed practice within the design field and is slowly emerging within educational contexts as an alternative way to investigate wicked problems. However, crafting and creating tangible objects is often associated with STEM skill-building and there is a lacking orientation on the learning potentials within social sciences and humanities. The purpose of this paper is to explore how educators across various disciplines can set up and facilitate speculative design learning experiments to generate discussions and stimulate hands-on learning among pupils. Contrary to conventional design practices, like industrial design or graphic design, which is focused on problem-solving, speculative design is about problem finding, which can seem counterintuitive for some students unfamiliar with the field. Thus, the paper aims to provide insights into didactical considerations to empower educators unfamiliar with speculative design to gain the skills, attitudes and confidence to set up their own speculative object-oriented learning experiments.

The paper centres around an explorative case study where folk school students from the Design and Maker course at Vallekilde Højskole have taken part in a 3-day workshop aiming to explore possible connections between their COVID-19 experiences and their climate change experiences with the intention to foster awareness and understanding about climate change. The empirical data is based on teaching observations and a theory is supported by a concluding questionnaire that points out the role of the objects as a form of metaphor as well as the learning design that enabled the participants to find connections between their COVID-19 -and climate change experiences. The case study draws on Kolb's learning cycle to understand how the experiences transform into knowledge through the creation, reflection and evaluation of the speculative design objects.

The case study highlights two concrete workshop situations that represent the metaphorical capacity of the objects to re-contextualise experiences into a new learning realm that opens up a more profound understanding of the two phenomena. The findings illustrate how speculation and object-making are key tools to open up complex phenomena and wicked problems. Moreover, it is crucial for the educator to design a learning context that scaffolds an explorative and playful atmosphere that gives students the confidence to initiate their own design processes.

Young Children's Ecological Participation in the Digital Interface

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Keywords: Early Childhood Education, Designs for learning, transduction, ecology, digital learning, digital tablets, sustainable development

We live in an anthropocene world with new problems that children are engaged in and want to solve. Ecological and sustainability learning is highlighted in children's lives and in Early Childhood Education today (Caiman & Lundegård, 2018) and so is children's engagement with digital resources (Kjällander & Riddersporre, 2019). If teachers – together with children – shall manage these challenges, new and creative ways to deal with these problems are, according to Sandri (2013) important to encourage.

This paper illustrates a research project in primary school where young children are engaged in a project on ecology where different species, digital resources and material from the nature contribute to the exploration of ecological related issues, relevant in the field of learning for sustainable development. Since children grow up in a digital era, their meaning making is transversed by digital and physical modes. Accordingly, using the term transduction (Kress, 2010; Mavers, 2011; Newfield, 2014; Stein, 2008) and by connecting video ethnography to multimodal analysis, this paper aims to understand how young children's participation and meaning-making in ecology is featured in both digital and physical representations through chains of transduction (Newfield, 2014). By remediation learning in natural sciences which is often understood as the final (often textual) pupils' representations we want to highlight the processes and how transduction can be used by researchers as well as teachers to visualize, understand and assess multimodal signs of learning (Selander & Kress, 2010) when pupils are using digital tools to understand ecology.

Specifically, the paper presents the ecological and sustainability learning consequences taking place in the transduction of modes in children's representations such as ink drawings, text, digital images and biological arrangements. The paper concludes with several educational concerns; the teacher's responsibility in supporting children's agency and development of ecological literacy, the interest in young learners' participation in a blurred 'digital-ecology' learning environment and finally, the educational needs of empirical anchoring in how designs for learning in sustainability might support children's processes on attachments at stake (van Poeck & Vandenabeele, 2012).

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The unbearable lightness of imagination. Teachers' and students' speculative futures

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Keywords: Educational imaginaries, Social science fiction, Teachers' representations, Teachers' agency, Teachers' profession

Teachers' everyday professional lives changed over a night during the pandemic, leading to an unprecedented pace in implementing digital resources in education. As such, the goal formulated by Swedish critical agencies in the Skoldigiplan (2019) was almost attained one year after with the shutdown of Swedish upper secondary schools and higher education in 2020. This study is motivated by the absence of professional agency that has been observable in teachers' changing practices pre-, present, and post-COVID19 (Haglind & Lindberg, forthcoming). Organizational structures and available technology have to a large extent dictated the rules for the transition to remote teaching and learning, without reliance on those who retain the knowledge about core areas, values, and intricate webs of relationships, that need to be maintained in times of crisis, to preserve learning outcomes.

This study targets the teachers' imaginaries, their visions about the future of education to give them agency in the current digital transformation. In particular, social imaginaries have been widely used as both a theory and a method to observe human capacity to bring new forms of being and doing into life through the power of thought and formulation (Chassay 2010; Jasanoff & Kim 2015; Jodelet 1989). Conceptualizing social imaginaries have been marked, on the one hand, by the continuous and undetermined creativity, as well as unlimited possibilities, that future-oriented imagination offers, as SF-literature bears witness to. On the other hand, it has been shaped by the constraints, limitations that history, culture, and social structures force upon humans (Castoriadis & Ricoeur 2016. Leblanc 1994).

To shed light on how teachers' professional agency can be empowered in times of uncertainties and social-technological change, we have collected qualitative answers from both teachers and students in the following three separate data sets:

1. An international survey study of teachers' and students' in higher educational settings focused on their psychological experiences transition to remote teaching.

2. Fifty-two narratives by upper secondary school teachers about their chronological experience transition to remote teaching.

3. One thousand seven hundred survey answers by upper secondary students and their evaluation of the transition to remote teaching.

Parts of these data sets' answers are future-oriented, pointing to how teachers and students imagine tomorrow's educational reality. This information is analyzed in the study as categories of seeds of what "could be" if seriously considered and brought into the light, according to Kozubaev et al. (2020). However, these crossed data sets' findings confront researchers in education with a dilemma that we intend to raise for discussion. The answers, which can be seen as dynamic interfaces between subject and world (Chassay 2010), are marked by conditions of what is "sayable" and "thinkable" in everyday life of constraints and restrictions. Significantly, the power of teachers'

imagination is apparently constrained by existing and pre-existing representations of the world. In the dialectical movement between innovative power and the power of the sedimented layers of past and present, the latter seems to dominate, while education needs teachers with visions.

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A designs for learning approach to resources and their affordances

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Keywords: Resources for learning and meaning-making, affordance, agency, situated meaningmaking, Designs for Learning

The use of resources, for various purposes, is a constantly recurring feature in all kinds of processes, not least in relation to learning and meaning-making. Consequently, how to approach learning resources, analytically and/or pedagogically, is a recurrent question among teachers and scholars. Based on examples from previous research projects, this presentation approaches the issue of resources for learning and meaning-making from a Designs for Learning perspective. What becomes a resource in a specific situation, to whom, how, with what social and epistemological consequences, and why? What resources are recognized as valid within these situations? What do these aspects tell us about learning? My interest here is, in other words, directed towards questions about resources in relation to materiality, meaning-making, agency, and power in education, learning, and meaning-making.

As a vehicle for reflecting upon various aspects regarding how resources are brought to play in situated meaning-making, the notion of affordance (Gibson, 1977) is introduced and further elaborated from a multimodal designs for learning perspective.

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Students' Voices on Multimodal Pedagogies

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Keywords: Multimodality, Multimodal Pedagogies, Multiliteracies, Social Media

In light of the demands in the contemporary digital communication environment, education systems all over the world are increasingly recognising the importance of developing multimodal literacy in students - to view multimodal texts critically, and to make creative multimodal representations effectively. Creative artefacts which students are encouraged to make include comic strips (Danzak, 2011; Unsworth and Mills, 2020), videos (Kaiser, 2018; Yeh, 2018), digital stories (Towndrow et al., 2013), websites (Walsh, 2007) and even a digital museum with augmented and virtual reality (Ho, 2010). The challenge for educators is how to design meaningful learning experiences to equip students with multimodal literacy. Beyond the broadening of focus in literacy to include multimodal meaning-making, multimodal literacy pedagogies are also associated with certain pedagogical shifts, such as a focus on bridging the students' out-of-school literacy practices with what and how they are learning in school (New London Group, 1996; Cope and Kalantzis, 2009, 2015). This often involves appropriating social media as well as introducing popular culture topics in the classroom. My talk discusses the students' perspectives on these ideas to inform the teacher's design of multimodal literacy learning (Osler, 2010; Levin 2000). Drawing on data collected through surveys and focus group discussions from a multi-phased research project on multiliteracies in Singapore (Lim, et al. 2020), we reflect on the students' expressions of their experiences and expectations on multiliteracies learning (Lim, Weninger, & Nguyen, 2021).

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Programming in basic education – what can we learn from a multifaceted assessment framework?

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Keywords: programming in primary education, programming assessment, assessment framework

During recent years, we have seen a global development, in which countries have introduced programming in their national curriculum (Balanskat & Engelhardt, 2015; Heintz, Mannila & Färnqvist, 2016). Some countries have introduced a new subject, such as "computing" in England, whereas other countries have introduced programming as part of a more cross-curricular area, such as "digital competence" in Sweden and Finland.

Regardless of how programming is introduced, the topic is new to most teachers, and there has hence been, and still is, a large need for proper teaching materials and professional development in order to answer the questions "what" and "how". As teachers start to integrate programming in their classroom, a new question arises: "how can programming be assessed"? Without appropriate assessment methods teachers cannot evaluate student learning, follow students' progress or determine the effectiveness or suitability of the curriculum at hand (Grover & Pea, 2013).

To date, there are no widely used assessment methods for programming at lower levels of education. Research suggests that multifaceted assessment (Grover, 2017) is needed in order to get insight into students' progress and learning. Focusing only on skills is not enough, as aspects such as experience (Wilcox & Lionelle, 2018) and self-efficacy (Bandura, 2002) can bring further light on the student's context. This can in turn guide the development of programming instruction, learning materials and exercises.

This article presents the PESS framework, a programming assessment instrument focusing on three aspects of learning to program: experiences, skills and self-efficacy. The framework is being iteratively developed within a longitudinal project on programming didactics in Sweden and contains separate versions for the three grade levels (1-3, 4-6, 7-9). Each version covers all three PESS areas, and the questions and assignments have been designed to be suitable for the respective level based on the age of the students and the corresponding curriculum requirements.

We will present the framework and discuss preliminary insights from distributing the framework in grades 1-9 twice during 2019-2020. All in all we have received over 1500 student responses that bring light on their experience of programming, their own attitudes and beliefs related to learning to program and their actual programming skills. We will focus our discussion on the suitability of the framework from three perspectives: 1) helping the teacher get insight into students' learning and progress, 2) benchmarking at a local, national and international scale, and 3) contributing to the knowledge of how programming can best be taught at lower levels of education. The study is part of

the research project "Programming didactics – Learning and Assessing Programming in Primary Education" funded by the Marcus and Amalia Wallenberg Foundation.

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Collaborative Design of Educational Digital Games

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Keywords: game-based learning, educational game design, digital games, digital game-based teaching

Recent research on digital games in education has shown that games have the potential to be effective tools for learning and support motivational, cognitive, behavioral, affective, physiological, and social learning outcomes. However, effects vary due to the heterogeneity of game designs that present different educational opportunities and challenges (Boyle, et al., 2016; Hainey, et al., 2016; Clark, et al., 2016; Connolly, et al., 2012). Research also suggests that game developers tend to design games that are fun but games might lack the qualities that facilitate knowledge acquisition. On the other hand, teachers might design efficient instructional material but fail to utilize game characteristics that are motivating and engaging (Marne, et al., 2012). Moreover, research points out that established ways of developing games can come into conflict with good educational game design (Marklund & Romin, 2020; Linderoth & Sjöblom, 2019). Teachers report they lack access to good-quality and curriculum-relevant games accompanied by a lack of sufficient financial resources to purchase games, preparation time, and access to adequate technology and professional development opportunities (Mathe, et al., 2019; Brooks, et al., 2019; Takeuchi & Vaala, 2014). This study raises the question of how game developers and educational stakeholders can overcome the complex challenges of digital game-based learning to realize its potentials.

The empirical context of this study is the Edtest testbed project in Sweden (2019-2021) funded by the Swedish Innovation Agency, Vinnova. The testbed is a joint initiative between educational technology providers, municipalities, and compulsory and upper-secondary schools in Sweden. The aim of the testbed project is to provide a platform for collaboration among the stakeholders to raise the quality of educational technology products as well as the digital competencies of teachers relevant to the acquisition of technology tools for teaching.

The present research is realized as a part of an on-going, independent Ph.D. research on digital game-based learning. The study employs a qualitative, multiple-case-study research strategy informed by activity theory and a sociocultural perspective on learning. Thus, the study focuses on understanding human activities as they continuously develop over a period of time and are influenced by their context. The activity theory perspective emphasizes the role of artifacts and contradictions which characterize complex activity systems and drive development (Kaptelinin & Nardi, 2006; Engeström, 1987).

Data in this study is collected from a compulsory school in Stockholm participating in the Edtest project, during the 2021 spring term. The selected participants are an educational game development company, two teachers as well as their students. Data is collected through non-participatory observations of playtesting, teacher and game developer discussions, document surveys, and semi-structured interviews with the involved stakeholders. Findings from the case

studies will be compared and provide an insight into how game developers and teachers transform their activities and design digital game-based learning tools adequate to educational needs.

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The semiotics of hair. Meanings of otherness, silence, social exclusion and motherhood in Kitty Crowther's picture book Mère Méduse

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Keywords: semiotics of hair, otherness, motherhood, social exclusion, multimodal analysis, provenance, picture book, Kitty Crowther

In this paper, I aim to analyze how hair is used as a semiotic resource to express meanings of otherness, silence and social exclusion, but also motherhood and empowerment, in the picture book "Mère Méduse" (2014) by Belgian picture book artist Kitty Crowther.

When Crowther was awarded the prestigious Astrid Lindgren Memorial Award in 2010, she was praised for her ability to portray "people in difficulty" and for "showing ways in which weakness can be turned into strength" (ALMA-Jury, 2010). Crowther herself has described mother Medusa as "an anarchistic, wild, a bit dangerous but very loving mother [...] an alcoholic, a thief, even a prostitute" (Crowther, 2015). On the cover and throughout the book, Medusas hair receives great salience within in the multimodal composition because of its size, the bright and golden color and because it often covers most of Medusas face and (other character's) body parts.

To analyze the meaning potential of hair in this picture book, a social semiotic approach is used where signs are seen as motivated and communication is believed to build upon the re-using of culturally available signs in new contexts to create new meanings (Van Leeuwen 2005; Kress 2010). In this sense all communication and production of meaning can be seen as a 'remediation of semiotic material' (Banda, Jimaima, and Mokwena 2018).

In my analysis, I focus on the multimodal depiction of the character of Medusa and explore the different potential meanings connected to her hair as a symbolic attribute on an ideational level, but also as a resource for social involvement on an interpersonal level. I explore how the concept of 'connotative provenance' (cf. Kress & Van Leeuwen 2001, Archer & Björkvall 2018, Archer & Westberg 2020) can be of use to analyze culturally and historically initiated potential meanings connected to Medusas depiction related to discourses about 'female duality' and 'the power of women's hair' (Gitter 1984) found in e.g. folk tales, mythology, art from the Victorian age but also other tales for children, but also more recently in studies about hair as a resource for power and social identity, also related to ethnicity and womanhood (Banks 1996, McMurtrie 2010, Johnson 2013, Cruz-Gutiérrez, 2019). Furthermore, I analyze Medusas hair as a resource for interpersonal meanings of social involvement and in-/exclusion as well as social distance, related to physical contact and proximity between depicted characters (see also Painter, Martin, and Unsworth 2013) expresing potential meanings of otherness, silence and social exclusion in the story.

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New designs for literary education: teaching core texts and skills on the digital platform

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Keywords: digital education, semiotics, transmedia, multimodality

Traditional models of literary education experience a worldwide crisis, as they are challenged by new types of texts and forms of media consumption. Young people often get acquainted with the literary classics not in its original form, but through multimodal and digital texts, which range from short summaries to memes and video games. Literary experience in the age of the Internet may seem chaotic, unpredictable and heterogenous, which can be contrasted to logocentric values of "specialist knowledge, authority, and authenticity" (Jewitt 2006: 323). The lack of teachers' attention to new types of texts and practices increases "the distance between formal educational environments and the extremely active 'digital lives' of teens" (Scolari et al. 2018: 810).

The presentation introduces a theoretical framework for integrating digital, multimodal and nonlinear texts into formal literary education. The methodological approach combines the ideas of multimodal theory and semiotics of culture, more specifically from the works of Yuri Lotman. Firstly, the coexistence of different versions of the same text is considered as a part of cultural autocommunication – the process of preservation and generation of knowledge in culture. Every text is seen in a row of possible forms and interpretations "none of which is the ultimate or ideal one" (Ojamaa, Torop 2015: 64). Secondly, the framework uses Lotman's (2000: 417) conceptualisation of two ways for learning culture – either as a sum of texts or as a set of languages. From this perspective, the main role of literary education is understood as guiding students in the world of versions and retellings.

The theoretical framework has formed a basis for Education on Screen, a digital learning platform for secondary school students that aims to enrich formal education through a deeper understanding of cultural processes. The project is developed by the Transmedia research group at the University of Tartu, Estonia, and by now includes three independent courses: Literature on Screen, History on Screen, and Identity on Screen. The courses are based on the key texts of Estonian culture and their adaptations in different media. The projects combine theoretical introductions, excerpts from films, interactive tasks, maps, and assignments for implementing creativity in multimodal forms. Testing of the platform started in the spring of 2017 and has so far involved more than 300 students. The experience of the team in developing and testing the courses is analyzed with the help of multimodal approach.

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Design of Semi-formal Learning Spaces in Politically Charged Social Media

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Keywords: Social media, Semi-formal learning spaces, Social semiotics, Netnography, Agency, Cross cultural research

This study explores how digital learning spaces with politically charged discussions are designed. A facebook group with politically charged content is analyzed to examine which affordances (Gibson, 1979; Kress, 2003) emerge and how these are used to create semi-formal learning and alternative places for communication. A social semiotic approach (Kress, 1997; 2003; Van Leeuwen, 2005; Selander & Kress, 2010; Jewitt, 2012) is used in combination with netnographic method (Kozinets, 2015), to investigate the particular aspects of designing for learning (Selander & Kress, 2010) in such semi-formal, digital, learning spaces. The results illustrate how traditional design aspects are intertwined with more modern, contemporary content. Learning democratic values, can be understood as one of the overarching themes in the facebook group. This is designed by using different symbols of diversity, in pictures and films (c.f. Jewitt, 2008). The need to understand the setting (c.f. Kress, 1997; Selander & Kress, 2010) and the sender in these kinds of social media (Boyd, 2014; Kozinets, 2020), is also discussed, in relation to what extent the users can act as agents of their own learning.

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Creating interest for STEM through Computer Game Making in an Informal Makerspace Learning Environment: Luleå Game Create

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Keywords: Informal learning, STEM interest, Makerspace, Computer game creation, Unity

This abstract presents the results from an informal learning process called Luleå Game Create where children, ages 7-15 and accompanying adults got a gentle introduction to computer game creation in a Makerspace [1] setting at Luleå Makerspace where special focus is given to gender equality [2]. Luleå Makerspace was founded in 2013 with the goal to provide an open learning environment [3] for people of any gender and background to realize their ideas, i.e. go from idea to prototype using modern tools and learn from each other. The Makerspace provides a creative environment where learning is done through either unstructured personal interactions or via organized workshops [4].

Luleå Game Create

Luleå Game Create is a series of informal workshops run during 2019-2020 where the participants learned how to create computer games. The format is based on that a workshop leader shows how to create different types of games and the participants get to make the games their own via various choices. The technical platform used is Unity, a professional game development engine [5].

Material for each workshop is designed with two parts; 1: pre-made digital libraries to help game creation, and 2: detailed instructions on how to create the game and highlights different features. The instructions are shared openly and can be used by the participants after the workshop [6]. The length of each workshop is 2.5 - 3 hours and the participants can either loan pre-setup computers at the makerspace or bring their own devices which they have to pre-configure at home. During the workshop much focus is placed on that everybody can follow along and participants are encouraged to help each other. Some of the children participate on their own and some together with an accompanying adult. Each workshop has between 10 and 15 participants and the workshops do not build on each other even though they might be divided up over two sessions. Focus is placed on gender equality with the long-term goal of raising interest for studying STEM and Computer Science subjects among young girls [7]. All workshops where open to both genders except one where together with the company Star Stable, a horse game was created.

Discussion and Conclusions

Luleå Game Create has run during 2019 and 2020 and so far about 75 participants attended the workshops. The feedback has been very positive with an overall grade of 4.5 out of 5 and 9 out of 10 say that they have gotten an increased interest in creating computer games and want to learn more. Requests for future topics include various details related to creating games but also other maker skills such as modelling for physical fabrication using 3D-printing and laser cutting. For the non-girl specific workshops, the gender balance is about equal between the children but surprisingly biased towards women among the adults (i.e. mothers and relatives) which has led to that a specific workshop for adult women is being planned. This is very positive as adult role models are important. During the pandemic the series moved online using Zoom instead but unfortunately with less interest from the earlier participants.

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App-Genres for Children's Agency -Affordances in Applications used in Preschool in Relation to Children's Agency

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Keywords: digital tablets, preschool, agency, genres, multilingual communication, literacy

In this study, the affordances of different applications used in Swedish preschools are explored and analysed, in relation to children's possibility to express agency when using them. In particular, the use of digital tablets in preschools in multilingual areas are in focus. Children's agency is understood as the possibility to actively participate in the preschool environment, being able to choose and create content as well as being able to communicate their interests. Multilingual children's possibility to communicate in more languages than the majority language, is in this study also seen as a form of agency. Video-observations of children's and teachers' interaction with digital tablets as well as each other make out the data. Recordings of the tablet screen have also been made. A social semiotic approach is used in the analysis to answer questions about which affordances that are created in the use of digital tablets in preschools in relation to children's possibilities to express agency.

A proposal for App-genres is made, with inspiration from children's literature genres, but with particular focus on the different affordances for participation in each application. These affordances, however, are seen as intertwined with the affordances of the digital tablet on which they are used. The affordances are also seen as created in the use; in social interaction between children as well as preschool teachers and sometimes parents. This intertwinement is discussed in relation to children's possibility to express agency when using digital resources. The importance of the choices teachers make when offering different applications to children in educational settings is highlighted. The inspiration from genres in children's literature is in this study also a way of emphasizing the significance of carefully examining and discussing the possibilities and constrains of different applications and digital resources. If similar attention was put into the contents of the digital resources now used in most Swedish preschools, as well as other forms of education, as when choosing children's books or other material, it could open up for a more conscious use of digital resources in education, especially in relation to children's possibility to express agency. The possibility to use the applications to overcome obstacles that are difficult to surmount without digital resources, are discussed. The possibility to use applications with different language content to create multilingual activities in preschool, even if the teachers themselves cannot speak the children's languages, is an example of this. A suggestion is made to move beyond the use of substitutepractices when using digital resources in preschool. The app-genres can be a way to start a broader discussion of using digital resources in a meaningful and socially sustainable way.

Analyses of teachers' use of pedagogical patterns and design work

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Keywords: learning design, design patterns, design for teaching, design work, protocol analysis

Research within Learning Design mainly seeks to understand how to most effectively support teachers as designers, often by developing design supporting tools that may allow for communicating and sharing good ideas of teaching with technology (Dalziel et al., 2016). For understanding how teachers use a specific learning design, namely pedagogical patterns, a workshop was arranged with the participation of ten upper secondary teachers. The teachers worked in five teams and where instructed to create a written design for teaching based on one or more previously written pedagogical patterns. A mediating resource, a Teaching Activity Plan (TAP), was provided for the completion of their designs for teaching. The teams' talk during the collaborative design work was audio recorded.

Support from previous studies involving use of learning designs, or pedagogical patterns, is limited, and so are studies concerning teachers design practice. Knowledge gathered in the field of design research (e.g. Cross, 2019) have therefore been a source to approach teachers design work in this study. The following questions guided the analysis: 1) How do upper secondary teachers use pedagogical patterns? and (2) What characterises teachers' design processes when they use pedagogical patterns?

The method includes analysis of the outcome of the design work that was captured in writing, and protocol analysis of the transcribed design talk (Stempfle & Badke-Schaub, 2002). The findings reveal that teachers find inspiration in pedagogical patterns, but that the use of them differs. Some teams used lot of suggestions provided in the pedagogical patterns while others more or less used them as a springboard for completely new designs with only a few similarities to the original. The design talk of teams shows that the design work bare similarities, and that differences mainly are due to problem or solution orientated design processes.

It is concluded that the study provides insights on teacher's use of a learning design and of design work that may contribute to a development of sustainable design support for teachers and their use of technology in teaching.

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Thinking with your Hands: Tacit Problem Reframing with Interaction Design Students

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Keywords: Design Pedagogy, Constructivism, Constructionism, Tacit Learning, Pedagogic Engagement

This paper explores pedagogic practice in design, specifically the teaching of problem reframing in Interaction Design. It describes an environment that simulated the experience of problem reframing through 'design thinking', and the findings from that exploration. Peter Rowe described 'design thinking' as a way of understanding the world while bringing about change, to describe the creative process at work in design (1987). For designers, the ability to solve design problems is important. When design problems involve 'problem reframing', then the ability to reframe that situation is an essential element of design thinking (Cross 2006; Dorst 2015). Resolving design problems can be accomplished with the application of 'divergent' and 'convergent' thinking processes (Guilford 1967; Lawson 2006).

The research perspective is Constructivist/Constructionist, where understanding is not transmitted, but is constructed by the individual (Piaget 2013), and where this mental construction of knowledge is accelerated by building physical objects (Papert and Harel 1991). Experiential learning is explored, including 'tacit knowledge', knowledge that is difficult to transfer by words or writing and can only be acquired through practical experience in context (Polanyi 1966). To simulate this environment, the solution-space of 'insight puzzles' was chosen. Insight puzzles have equivalence with design problems, as both need problem reframing to resolve them (Weisberg 2015).

31 design students attempted to solve 3 tangible 'insight puzzles' representing 3 historical examples of 'Design Thinking'. To solve them, the students would need to 'reframe' the original argument and rebuild the puzzle to create a satisfactory design solution. The format of this pedagogic experiment was informed by Self-determined Learning theory, which posits that engagement is positively affected by supports that facilitate 'competence' (becoming effective in performance), 'relatedness' (feeling understood and cared for by others), and 'autonomy' (being the originator of one's behaviours) (Deci et al. 1991). Their puzzle-solving activities were recorded on a 4-camera setup, and all participants were interviewed afterwards. Both sets of data were analysed to understand this externalising of their internal mental processes. Their physical actions where categorised and analysed using standard video analysis methodologies (Heath and Hindmarsh 2002), and their interviews were analysed using a Thematic Analysis approach, to make sense of collective, shared meanings (Braun et al. 2018).

Methods that help design students learn to think like designers already exist. Sketching is exploratory, helping the designer to create unintended consequences, what Donald Schön called a "reflective conversation" (1993). This exploration helped design students to learn to think in a designerly way by engaging them physically. Students enjoyed learning about reframing but also had their individual strengths and weaknesses exposed in real time. Some were quick to reframe the problems correctly but struggled to realise solutions. Others were slow to reframe but once they had, they found building a solution to be elementary. They left the experimental space knowing that they now had a concrete understanding of the abstract concept of 'reframing an argument' and "fixation". Whether they solved all three puzzles, or failed to solve any, they learned about the concept and themselves in a productive way.

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Dilemmas and opportunities in online education - What impact does the rapid digitalization and the transition to distance learning have on teaching and learning within the framework of art education and teacher training? PhD Masterclass

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Keywords: Distance education, online conference tools, teacher education, aesthetic practices, Designs for learning, meaningmaking, Actor-Network Theory, intra- activity, Situated learning

The project intends to investigate how teaching and learning conditions are affected when aesthetically oriented practices are transposed to distance education. The study is based on the assumption that the situation challenges the participation of both teachers and students as well as expectations, habits and the pedagogical approaches that we normally take for granted. I'm interested in making visible how teachers and students meet and interact when using online conference tools such as Zoom or Teams. Another possibility is to look closer at if, and in that case how subject content and aesthetic practices change under these new circumstances. The study intends to move within the framework of teacher education and with a focus on art, media and design education.

Resources and semiotic resources

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Keywords: Resources framework, Social semiotics, Reasoning, Physics Education Research, Science Education Research

There has historically been a tension between researchers of sociocultural epistemology (in which systems of meanings are viewed as constructed) and researchers of cognitivist epistemology (e.g. Hmelo-Silver, Duncan, & Chinn, 2007; Kirschner, Sweller, & Clark, 2006; Sweller, Kirschner, & Clark, 2007). Social semiotics could be said to share the sociocultural stance on knowledge (Lemke, 1990). Criticism against cognitivism (or mentalism) has also been raised by researchers of social semiotics (Lemke, 1990). The resources framework (e.g. Hammer, 2000; Redish, 2004) is an attempt, within Physics Education Research (PER), to negotiate between the two epistemologies in which the concept of resources (a general concept for knowledge elements) is used in analyzing reasoning on a cognitive level. A resource could be a relationship between two properties ("bigger is stronger"), a specific memory ("the introductory calorimetry lab in intro chemistry") or some prototype of multiple instances of experience ("what goes up must come down").

The resources framework, like social semiotics (Lemke, 1990), emphasizes the importance of context and contextualization (or framing in the terminology of the resources framework) in learning. Within the resources framework, context, which frames an activity, emerges from more fine-grained elements of an activity such as the cognitive resources that the learners bring into the activity. The concept of (cognitive) resource do, however, only take the cognitive aspect of the situation into account and the framework does therefore lack a tool for analyzing, compared to a broader aspect like context, more fine-grained social aspects of a learning activity, such as the what communicative aspects that the learners base their meaning making on. Social semiotics can provide the necessary conceptual tool for this in the concept semiotic resource (and semiotic system) (e.g. Kress & van Leeuwen, 2002), the aspects of an activity that we make meaning with, for example colors, sensations and gestures.

As an empirical example, consider an excerpt from an earlier study (C. R. Samuelsson, Elmgren, & Haglund, 2019) in which two students investigated a salt reacting with water from the air by using an infrared (IR) camera. As soon as they observed the salt with an IR camera one of the students exclaimed "It gets very red and..." to which the other student responded "In other words, it is warm." Which was then explained by "That it has attracted [...] water from the air and that the exothermic dissolution reaction has started.". An analysis of this excerpt, applying both the resources framework and social semiotics (R. Samuelsson, 2020) would treat the focus of the initial observation (the color red) as the semiotic resource from which the students would employ a set of cognitive resources to interpret and explain the phenomenon: "Red" supports a coherent activation of cognitive resources related to sensations such as "warmth" and "humid air", in addition to related resources such as "exothermic reactions".

I would like to discuss how, and if, the concepts of semiotic resource and cognitive resource can be fruitful in analyzing reasoning in this way.

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Teachers' technology use in learning-design: aspects of meaning-making and co-design

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Keywords: Multimodal, Multimodal layers, Technology use, Teacher, Meaning-making, Learning-design, Co-design

Current research indicates that teachers' and students' use of technology influence each other, especially relating to the ideas of learning-design and co-construction (here co-design) of classroom practice (Bezemer & Kress, 2016; Lim, 2021). However, previous research on teachers' use has overtly emphasized different pedagogical aspects of technology use in teaching (Lai & Bower, 2019). There is a lack of studying teachers' meaning-making (actions and sign-making, Kress, 2010; Wartofsky, 1979) through technology use that is essential for understanding the reciprocal relationship between prompters in shared design of classroom practice between teacher and student (Bezemer et al., 2016). This paper aims to explore how teachers make meanings in technology use from a multimodal layer (ML) approach (Schnaider, Gu & Rantatalo, 2020) by focusing on questions: How do teachers use configurations of hardware and software? What are the outcomes of technology use in the framing of different learning-design activities?

Data was collected and analysed based on the five ML components i.e., technologies (hardware/software), functional properties, semiotic properties, modes of representation, and activities (ibid.). The data consisted of video recordings, interviews, and observation notes. All data were transcribed or annotated into texts and segmented into sentences (lines/stanzas) based on how they framed MLs' categories (Shaffer, 2017). Quantitative content analysis (Bell, 2011) was conducted first by using nCoder to strengthen interrater-reliability and validity in the MLs' categories (the codes), and then by using the Epistemic Network Analysis program (Shaffer, 2014) to visualize the connections between the different categories in graphs for interpretation of variations and overlaps.

The findings show that teachers' technology use is often undertaken with emphasis on some of the MLs. For instance, in activities, teachers tend to use technologies mainly for distribution purposes, which have little or no connection to learning-design or co-design. Moreover, teachers' meaning-making through technology use is often linked to levels of mediation in actions such as work in handling functional properties in modes of representation speech and gestures, and therefore, limitedly related to sign-making by using the technologies' semiotic properties. On the other hand, design for collaboration was undertaken between actors in the use of smartphones and projectors in brainstorming and reviewing new subject areas, where functional and semiotic properties were used to arrange and superimpose content in verbal communication and writing activities.

This study provides some insights for an overall understanding of how technologies are used in the classroom by teachers. When the MLs are recognized and realized, it enables successful learning-design and informs co-design that benefit students' use of technologies in learning. Moreover, a shared use by teachers and students contributes to greater insights into how their meaning-making is undertaken separately and overlap. If teachers and students jointly design the learning environment

through knowledge of ML, a variety of different technologies will be implemented more naturally and effectively.

Planning for safety when preparing for war: winning or learning

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Keywords: Safety, Learning, Activity theory, Military

Preventing accidents within a complex environment like a force on force military exercise is challenging for the organization. The aim of this study is to investigate safety behavior by using activity theory in combination with critical incident technique in order to identify conditions effecting the health and safety of individuals employed by the Swedish armed forces (SwAF) participating in military exercises. The empirical data was collected from two separate events final planning conference of Northern Wind 2019 (FPC-NW19) and the exercise Northern Wind 2019 (NW19). Data was collected using observations and conversations with military, medical and safety professionals. One researcher followed the FPC-NW19 and the observed the exercise NW19 by shadowing staff members and safety personnel.

Data was analyzed, thematized and coded using the third generation of activity theory and its areas: tools, rules, community, division of labor, subject and object as a guide for identifying contradictions. Results indicate that the methods used for planning and the use of safety equipment when conducting military tasks during the exercise is influenced by the desire of winning the exercise. The results also indicate that activity theory can be a useful tool to identify contradictions affecting safety performance. However, the study is only limited to two events with a narrow scope from the Army. Further refinement is needed to develop a functioning method for analyzing safety behavior.

An Analysis of Online Support for Group Work in a Student Design Assignment during Covid-19

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Keywords: Online Support, Group Work, Video Analysis, Interaction Analysis, Formal Learning Design Sequence, Covid-19

Covid-19 have changed the learning conditions for university students in Sweden and in other countries, at the same time as their courses have moved online. One concrete change for many students was that courses required that students used video conferencing tools such as Zoom, and other tools used for distance education, as a complement to learning management systems and other tools already in use before Covid-19.

Many research studies have asked students about their experience of distance education during Covid-19. However, not many studies have used observation for collecting data on how students are using online tools in distance education.

For some courses, as for example courses where small groups of students design interactive systems or apps together, it might be difficult to design good online learning activities. As a comparison, when students do these types of learning activities on campus they work in small groups with many materials and many tools in rapid cycles of transforming and forming representations (Selander, 2008; Selander & Kress, 2010) until they reach a common representation that they hand in for assessment.

The purpose of this study is to contribute to the body of research on students experience of online learning during Covid-19 by presenting a video analysis of how a group of four university students complete a design assignment together online. One single group is focused because this allows for detailed video analysis with transcribing and annotating audio and video down to seconds.

The assignment was to design the look and feel of an app for ultramarathon runners. The group completed the assignment by using a number of different tools: Zoom for audio, Google Docs for writing a report, Messenger for short text messages, Google Sheets for creating the visual design of the app interface, and moodle for reading the assignment.

Data collection was done by the students themselves by using their mobile phones for collecting video and audio data. The mobile phones were positioned so that they could capture both the computer screen and the students' gaze, bodily position and movement. The group completed the learning activity in a little more than 1,5 hours on two different occasions. The video analysis uses interaction analysis (Jordan & Henderson, 1995) to understand how students reach a common representation. The common representation was supported by, for example, how they used synchronous editing of files shared online, how they talked about what they were doing at the moment and how they used direct text messaging.

In one further step of the analysis the formal learning sequence (Selander, 2008; Selander & Kress, 2010) is used as an analysis model for identifying not only which resources the student group used for transforming and forming the common representation, but also which of the resources available to them they did not use. For example, in developing the design of the app for ultramarathon runners the setting in which the students are to reach a common representation was limited by what

the students could see, what they could edit by using the online tools and what they understood from what they were trying to achieve at the moment.

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Students' design of argumentation in essays within Upper secondary schools

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Keywords: Argument, Design, Writing essays, Multimodality, Upper Secondary School

In upper secondary schools, the argumentative essay is a common genre that students learn to write before they begin further studies in higher education. Many upper secondary schools and even universities provide students with writing templates, and supervisor feedback draws attention to guidelines for what an essay should contain in terms of structure and content. Nonetheless, students have often shown difficulties in applying general guidelines and detecting differences in genre writing in relation to social events and contexts. Even recent research (Howell, Butler & Reinking, 2017; Huang & Archer 2017) draw attention to an array of multiliteracies, in which they expand the concept of literacies for constructing an argument to also include other modes such as visual, spatial and audio. An argument can be established in different modes (Groarke, 2015), for example in one mode at a time or by an intertwined mix of many modes, juxtaposed or the modes can realize parallel different or contrasting arguments. The literature review reveals, that little attention has focused on how upper secondary students are designing text in the academic writing genre and how they make arguments in essays within upper secondary school programs. This study thus addresses the relatively unexplored area of how upper secondary school students represent academic arguments in essays. The aim of the study is to explore how students represent arguments through the use of writing and visual resources. The study poses three research questions: (i) How do students arrange the texts in the essays? (ii) What content do students design in the essays? and (iii) In what ways do students use visual resources in writing and what functions do these resources realize in the argumentation? The theoretical framework draws on a framework of design for learning (Selander & Kress, 2011) in combination with a multimodal social semiotic perspective (Kress, 2010) and concepts from these perspectives will guide the examination of the arguments in the students' essay. Data of 54 essays with a pass grade was collected from students' last year of upper secondary school education in Sweden, and analyzed using a multimodal social semiotic perspective on argumentation. By presenting descriptions on representation of arguments, the study gives an insight of how students write contemporary essays with academic requirements by using digital resources. The results reveal that representation of academic argumentation varies between the essays. There is an over-representation of descriptive and supportive arguments in written mode and a design of texts which are grounded in various types of web-based resources. The article concludes that students design of essays can be improved if key features of reasoning and affordances of multimodality can be acknowledge in teaching of academic writing in essays.

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The camera as a tool for meaning-making

PhD Masterclass

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Keywords: social semiotics, multimodality, education based research, digitization, visual meaningmaking, interaction, transduction

The globalization and the digitization of society have had a major impact on how we communicate and learn in both informal and formal settings. But while young people today gain a lot of their experiences in multimodal environments where they are both consumers and producers, the schools provide learning environments dominated by oral and written modes. In situations where the students get the possibilities to represent their understanding using other modes, for example visually and audibly in a multimodal text, teachers seem to assess only the oral or written parts (Borgfelt 2017; Godhe 2014). In Sweden, a lot of schools provide their students with computers or iPads as resources, showing the impact of digitization in society today. The technical devices are used for writing, searching information and to some extent making presentations (SOU 2014:13), but the new possibilities for different modes as tools for meaning-making are poorly explored.

This PhD project has a multimodal and social semiotic approach. The aim of the study is to explore how students make meaning and learn when they communicate by photographing. The results of the study will deepen understanding of how to use the camera as a tool for meaning-making and how to acknowledge students' visual experiences and meaning-making in education.

These are the preliminary research questions:

• What resources do students use when they communicate by photographing and how do they use them?

• What signs of learning do the students make when they photograph and interact around each others photographs?

The design of my PhD project is inspired by educational design research. During a first phase 20/21 I collaborate with eight teachers. During the autumn we have explored how students (10–12 years old) can use the camera function on their iPads in different subjects and for different purposes. We have also explored the students' interaction with another around photographs. The students have for example, answered questions, represented opinions, portrayed feelings, and documented processes. Together, we noticed the high level of engagement among the pupils during the photographing, an engagement that didn't always last to the interaction around the photographs. During the spring, the work in the first phase continues. The teachers have designed different learning sequences in which the students will photograph and interact around each others photographs in different subjects and for various purposes. In the second phase of the study (August–December 2021) an investigation will be designed based on the findings from the first part of the study.

During the master class I would primarily like to discuss my use of theory and how my theoretical perspective is linked to my research questions and my choice of methodology.

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To visualise and transduct representations

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Keywords: social semiotics, multimodality, education based research, digitization, visual meaningmaking, interaction, transduction

What is power? How can liberty be portrayed? How can you visualise what you have been working with during this lesson? What is going on in this photograph? The globalization and the digitization of society have had a major impact on how we communicate and learn in both informal and formal settings. But while young people today gain a lot of their experiences in multimodal environments where they are both consumers and producers, the schools provide learning environments dominated by oral and written modes. In situations where the students get the possibilities to represent their understanding using other modes, for example visually and audibly in a multimodal text, teachers seem to assess only the oral or written parts (Borgfelt 2017; Godhe 2014). In Sweden, a lot of schools provide their students with computers or iPads as resources, showing the impact of digitization in society today. The technical devices are used for writing, searching information and to some extent making presentations (SOU 2014:13), but the new possibilities for different modes as tools for meaning-making are poorly explored.

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The design of my PhD project is inspired by educational design research. During a first phase 20/21 I collaborate with eight teachers. During the autumn we have explored how students, (10–12 years old) can use the camera on their iPads in different subjects and for different purposes. We have also explored the students' interaction with another around photographs. The students have for example, answered questions, represented opinions, portrayed feelings, and documented processes. Together, we noticed the high level of engagement among the students during the photographing, an engagement that didn't always last to the interaction around the photographs. During the spring, the work in the first phase continues. The teachers have designed different learning sequences in which the students will photograph and interact around each others photographs in different subjects and for various purposes. In the second phase of the study (August–December 2021) an investigation will be designed based on the findings from the first part of the study.

At an oral presentation at the conference I will describe and discuss the students' meaning-making during three different learning sequences in which they use the camera for various purposes and interact with one another around photographs. I will also explore the meaning-potential and possible affordances in the photographing and interacting parts of the learning sequences.

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Making meaning in different school subjects in Swedish secondary school PhD Masterclass

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Keywords: literacy practices, designs for learning, sign-making

During their three years in secondary school, Swedish 14-16-year olds study 17 school subjects. In an average school week, the students move between 10-12 subjects, meeting various literacy demands in settings designed by teachers with different disciplinary backgrounds and interests. The aim of this study is to explore such teaching and learning practices and what kind of meaning making is made salient through the teachers' choices regarding designs for learning as well as the student's choices in their designs in learning. The results will be discussed in the light of a social perspective on literacy, where literacy is considered as participation in a literacy practice, and disciplinary literacy as specific ways of communicating and constructing knowledge (cf Moje 2008).

Taking an ethnographic stance, data was collected while following one Swedish secondary class (students age around 15) for four weeks. The primary data consists of videotaped lessons, photographed texts and other artefacts, supported by secondary data of observation notes and interviews.

The study is framed within social semiotic perspectives on multimodality, where sign making, and the idea of the motivated sign, are important for the understanding of communication and learning (Kress 2010). Design for learning contributes with the dual perspective of the teacher's design for learning and the students' design in learning (Selander & Kress 2010). In this study, this means that the subject practice is understood as a realisation of the teacher's design of learning activities as well as the students' choices in their learning processes. Accordingly, the model LearningDesignSequences (Selander 2008; 2017) is relevant for framing the analyses. Firstly, an overall analysis of the teachers' design is made, focusing on activity goals, relations emphasized, and resources made available. This enables a comparison with the three meta-functions put forward by Halliday (1978) as always simultaneously present in meaning making: the content (the ideational meta-function), social relations (the interpersonal meta-function) and the arrangements of resources (the textual meta-function). Secondly, a selection of teachers' and students' representations is analyzed as multimodal orchestrations with tools from social semiotics. Thirdly, smaller sequences of representations are analyzed grammatically with tools from systemic functional grammar. By the time of writing this abstract, I am going back and forth between analysing the material from chosen subjects and adjusting the operationalizing of tools and methods. My intention of attending the PhD-class is to present results from one subject, and in dialogue with the other participants scrutinize possibilities and constraints of the used methods; foremost related to the results actually presented, but also considering the over aiming project of examining several subject practices.

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Two Steps Forward and One Step Back: Remediating an International Masters' Programme Environment

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Keywords: joint master, digitalization, intercultural, interdisciplinary, design processes, autoethnography

This study presents the ongoing development of the Social Sciences of Sustainability umbrella platform at Jönköping University, which currently brings together three separate international masters' programmes, a decision made by the School of Education and Communication. Our primary focus is one of them, the in itself interdisciplinary Learning, Digitalization and Sustainability (LeaDS) programme, which has its foundation in the field of education, but branches out into communication, leadership, digitalization, culture, diversity, and social sustainability. We outline the process of remediation from when the programme was first conceived in 2019 as a joint international partnership between universities in Mumbai, India, and in Jönköping, Sweden, towards the still international, but also sustainability-oriented and interdisciplinary platform that currently is being built at Jönköping University. The process has involved taking two steps forward and one step back for a number of reasons and, through an autoethnographic lens (Adams, Holman Jones & Ellis, 2015), this presentation aims to discuss the process of intercultural, interdisciplinary and interpersonal professional/academic learning that have taken place over the last few years. Why have some aspects, constellations and collaborations worked well and continued to be a part of the developing programme whereas others turned out less sustainabile?

In the autumn of 2019, the first pilot course, Digitalization and Implementation Processes in School (DIP1) was launched followed by DIP2 in the spring. In the autumn 2020, both DIP1 and DIP2 were remediated in terms of design, in terms of level (as doctoral equivalents/third cycle courses are now offered as well), and with regard to how they fit into the structure of the upcoming programme LeaDS. The initial programme specific group (LeaDS), already interdisciplinary, was extended to include the competences represented in the other two masters' programmes, Sustainable Communication (Media and Communication studies) and GlobalS (Global Studies). All partners have taken part in a shared process of remediation to integrate the umbrella platform idea. Issues growing out of the creation of joint courses, elective courses, as well as programme specific courses, revealed challenges and structural constraints. Another decision, not yet taken due to the pandemic, concerns whether teaching should be online/offline or a hybrid/hyflex, but this is also a reflection of how we as programme designers have collaborated during the process.

In order to map the various voices involved in the process outlined above, we are drawing on Smyth, MacNeill and Hartley's (2016) conceptual matrix, which "suggests four key constructs to identify the key dimensions of the Digital University." The model highlights digital participation, information literacy, curriculum and course design, as well as learning environment aspects. In addition, we rely on Trowler and Cooper's (2002) concept teaching and learning regimes as we explore the instantiations, selections, negotiations and contestations, and with this a focus on power and agency (Deleuze & Guattari, 1986), involved in the remediation of teaching and learning regimes as analytical points of departure to illustrate our autoethnographical navigation around unforeseen challenges and obstacles.

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Using social semiotics as a lens to study the role of physics devices in the teaching and learning of science

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Keywords: Physics devices, Magnetic field, Laboratory work, Social semiotics, Transduction, Science learning

It is widely accepted in the science education community that laboratory work potentially offers the best platform for exposing students to the particular ways in which natural science disciplines make and communicate scientific knowledge. For students of physics, learning with purposely designed laboratory tools and measurement devices is an integral component of their undergraduate experience. Students must not only grapple with the specialised language and praxis of physics, but they must also learn how to interpret the information these specialised tools produce and relate this to scientific concepts.

In this presentation, we explore the learning challenges that the use of physics devices present. First, physics phenomena are often not perceivable through our senses—devices are thus designed to detect environmental signals and filter, intensify and/or transduct this input to modalities that we can experience. Second, the disciplinary meanings of the information presented by devices need to be interpreted—and students need to practice this skill. Finally, and perhaps most importantly, the chains of transduction that occur within the device are mostly hidden.

In this study, we use the iOLab—an interactive Online Laboratory system—which consists of a handheld sensor box that communicates wirelessly with a computer on which the software is loaded to process and present results on the screen in real-time. We selected one of the on-board sensors to detect an "invisible" signal in the environment (the Earth's magnetic field), and gave students an open-ended task—to find the direction of the field in the laboratory classroom. This required them to interpret the three colour plots on the graphical display representing the three Cartesian components of the field. We video-recorded pairs of students working with the tool. After reviewing data from six groups and several rounds of pre-analysis, we performed a full multimodal transcription of a 40-minute selection of one pair's engagement with the task.

Our analysis highlights the importance of transduction in activities where multiple modes are used to communicate and make meanings between and across a range of semiotic resource systems. Transduction is not only an essential function of most physics devices, we also find that student-initiated transductions can be a sign that learning is taking place. Such transductions offer the opportunity for teachers to assess student learning.

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Learning transversal competences in STEAM-education – a case study from Finnish primary school

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Keywords: STEAM-education, Collaborative learning, Self regulated learning, Computational thinking, K12 education

Background and purpose of the study

In this study, we aim to widen the understanding of learning in STEAM context.

Collaboration and communication skills, regulation skills as well as computational thinking skills are essential to master in every field of work, and therefore these skills should be enhanced throughout education (Binkley & al., 2012; Blikstein, 2018; Iwata, Pitkänen, Laru & Mäkitalo, 2020). In Finnish national curriculum for primary and secondary education various transversal competences are emphasized, including collaboration and self-regulation. STEAM-education is one potential context to support the development of these skills since they offer possibilities to negotiate, create, and collaborate with open problems (e.g. Vuopala & al., 2020). Although STEAM-education is becoming more popular in every level of education, there is a lack of empirical research focusing on learning within STEAM-projects. Therefore this study aims to widen the understanding of the pedagogical effectiveness of STEAM-education in enhancing 21th century skills in primary and secondary education. The specific research questions are:

RQ1: How do students' collaboration skills and computational thinking skills develop during STEAMproject?

RQ2: How do students regulate their learning and working? RQ3: What do students learn in STEAM-project?

Theoretical background consists of collaborative learning (e.g. Dillenbourg, 1999), regulation of learning (e.g. Hadwin, Järvelä & Miller, 2011) and computational thinking (Denning & Tedre, 2019). In addition, STEAM-education is defined in order to understand the context of the study.

Methodological considerations

The empirical study will be conducted among primary (4th and 6th graders, N=44) and secondary (8th graders, N=22) school students who are studying in technology-oriented classes and who are participating in STEAM-project as part of their everyday activities in school. City of Oulu has a community of STEAM schools together with University of Oulu (Milar & al., 2020); chosen school is

representative example of that community. The data will consist of questionnaires and structured learning diaries. Qridi-platform (http://www.qridi.com/) and Microsoft Teams are applied when collecting the data. Data collection will start on February and last until April 2021. The data will be both quantitative and qualitative, and therefore descriptive statistics (Chi, 2000) and qualitative content analysis (Miles & Huberman, 1994) will be applied in data analysis.

Expected results and conclusions

It is expected that students' collaboration skills, regulation skills as well as computational thinking skills develop during the project. Also, it is expected that even the 4th graders can plan, monitor and assess their progress and learning when they are guided and supported to do that. In addition, it is assumed that, within STEAM-education, students learn both contents and skills. The results provide useful knowledge especially for teachers about the pedagogical value of STEAM-education, and show their potential in enhancing 21st century learning skills. In addition, results can indicate gender differences in motivation, aims and reasons to study and learn within STEAM-projects. Gender differences might be valuable to be aware of, since at least in Finland, one national level goal is to support girls to choose a career path in the technology industry.

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Children's Out-of-school Learning in Digital Gaming Communities

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Keywords: children, digital communities, learning, Minecraft, Wenger

Abstract

The aim of this study is to investigate children's out-of-school learning in digital gaming communities. Since girls' gameplay is underrepresented in research (cf. Ito et al. 2019), this study explores girl's participation in Minecraft communities, guided by the question: What characterizes learning in girl's out-of-school Minecraft communities? This study answers to Halverson's (2012) call for a shift in research perspective on education by paying less attention to 'what works', and more attention to 'what's happening' and 'what's possible'. Thus, learning will be explored by studying girl's situated learning in Minecraft, chosen mainly for its complexity insofar as it offers children the opportunity to compete, play and/or design new worlds. Data were generated through interviews, video-recorded play sessions and video-stimulated recall. Multimodal interactional analysis was applied in order to analyze children's actions via mediation, seeking representations as signs of learning. The components of Wenger's Social Theory of Learning were used as a basis when exploring learning in children's out-of-school digital gaming communities. Five significant themes were identified: learning through experiencing, learning through belonging, learning through performing, learning through struggling and learning through enacting participatory identities. The main findings are presented in a tentative conceptual framework, that visualizes the characteristics of children's out-of-school learning. The conceptual framework can assist stakeholders who are interested in connecting children's out-of-school learning experiences with supporting, challenging and problematizing children's learning in school. The framework can also be used by policymakers in discussions on children's learning as it reflects what education might look like when the focus is shifted from 'what works' to 'what's happening' and 'what's possible'.

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Designing programming activities. A gender perspective

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Keywords: programming, education, design, gender

In Computer Science (CS), males are overrepresented n higher education and work-life related to CS. In 2014 England introduced 'computing' as mandatory in their national curriculum. Sentence (2019) argues that the new curriculum and its requirements "... challenge stereotypes around who can study computing." (p.1). Education plays a crucial role in engaging a diversity of pupils to become interested in and proceed with a CS career. Since 2018, Swedish primary school has implemented programming in the curriculum. One, of the many reasons, for implementing programming is to encourage and introduce programming to a diverse group of students. This paper aims to explore and shed light upon inclusion in programming didactics in primary school. In this presentation, we will discuss how tasks and instructions can be seen as inclusive when it comes to a diverse group of students focusing on gender. The following research questions have guided this study: How are programming activities designed in primary school? In what way are these activities considered to be gender inclusive?

The theoretical framework used to analyze the empirical material is at the crossroad between multimodal social semiotics (Kress, 2010) and a design-oriented perspective (Selander, 2008). From these perspectives, students' learning processes are continuously situated in a social and cultural context. Learning is seen as a design-process of semiotic transformation and formation by the students in different activities (Selander, 2008). The empirical material consists of classroom video-observations and interviews with teachers. A total of 27 lessons have been observed and video recorded. In the presentation, the programming tasks within the aged 10-11 years will be presented. During 2019 - 2020 nine programming activities with students aged 7-14 years have been observed.

From the tentative analysis of two programming activities, two aspects will be raised and discussed 1) interest and engagement 2) representations of knowledge. Firstly, regarding interest and engagement, the boys immediately got into the task from their interest, which was football, and they started to design a football game. The girls started working with the instructions that the teacher handed out. From a gender perspective, the boys might find programming more creative and fun, and the girls might feel less engaged as their interest falls into the background. Secondly, the use of knowledge representations might affect who is seen as an expert within the field. A male recorded the video clips that were shown and used in the lessons. The resources used in the lessons can be seen as representations of knowledge, and they are always connected to a social and cultural domain (Kress & Selander, 2012), in this case, a domain foremost represented by males.

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Remediation of text sources for the subject of English in upper secondary school: consequences for representation, interaction and learning

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Keywords: English language pedagogy, remediation of text sources, Multimodal Social Semiotics

The massive upgrading of digital infrastructure in Norwegian schools has led to increasing digitisation of learning materials in the subject of English. Consequently, texts from the Internet are regularly used as text sources for work with curricular topics, particularly at upper secondary level. In practice, this means a transduction (Bezemer & Kress, 2008) of curricular topics from the textbook as site of representation to the World Wide Web. The present paper asks what this transduction entails in terms of representation of curricular topics and initiated interaction with the learner of English, in particular as the revised Norwegian national curriculum puts an increased emphasis on in-depth learning and critical thinking (Ministry of Education, 2019). Within the context of curricular work on 'the English-speaking world' as an overarching topic, this paper presents a multimodal analysis of two Internet texts connected by hyperlinks to educational websites constructed for the subject of English, the first one a Wikipedia article and the second one a report from an online news portal. Using a framework based on Multimodal Social Semiotics (Kress & van Leeuwen, 2006), the analysis focuses on features of representation of curricular topics and initiated interaction with the reader. Findings show that the text samples retrieved from the Internet provide readers (students) with different perspectives on the topics than those typically taken in textbook texts (Ørevik, 2019). Further, while the analysed text samples are potentially more challenging with regard to language and cultural references than conventional textbook texts, they are found to assign more independent participant roles to readers (students), conducive to increasing students' agency and engagement. The findings are discussed in terms of their potentials for promoting in-depth learning and critical thinking within the subject of English.

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Game modding for learning design thinking on an e-learning platform

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Keywords: game modding, game-based learning, design thinking methodology, e-learning

Game-based learning and game-design approaches have been utilized in teaching complex and diverse subjects such as programming, mathematics, and linguistics in order to enhance student involvement, enjoyment and commitment (Squire, 2003). In the design domain, unconventional and creative techniques are also employed due to the design process' non-linear, ill-structured and iterative nature. However, when teaching the design thinking methodology, lack of association with games is being reported (Cooke, Dusenberry & Robinson, 2020). The key research question of this study addresses whether and how a game-design approach affects teaching the design thinking methodology in a more effective and playful way.

Thus, this in-progress study aims to investigate the impact of game modding as a way of game-design on students' comprehension of the design thinking methodology. Game modding refers to modification of existing games (El Nasr & Smith, 2006) which increases the engagement of players with the game (Sihvonen, 2010) and combines the roles of player and designer (Kynigos, 2004). This paper discusses an online, student-centered, open-source platform developed in the scope of an Erasmus+ KA2 project with the aim to remediate the learning system. The platform conceptualizes the design thinking methodology onto an imaginary planet with 4 continents (phases). Its design was framed by the ideas of constructionism, according to which new knowledge is constructed by students when they collaboratively built public digital artifacts (Papert & Harel, 1991) and by gamebased learning approach (Prensky, 2005). The latter is integrated into the platform through the use of "ChoiCo" games (Choices with Consequences) as a way to enable students explore and develop an understanding of the four design thinking stages; discover, define, develop, deliver (Design Council UK, 2021). "ChoiCo" is an online authoring tool developed for playing, designing and modifying choice-driven simulation games related to complex real life issues (Kynigos & Grizioti, 2020). In order to investigate the effectiveness of this online platform on students' comprehension of the design thinking methodology, a pilot study was conducted at a Belgian University during the 2020-21 Fall semester. The platform with the games was implemented in a 3rd year bachelor design engineering course. Quantitative and qualitative methods were utilized in order to elicit data and information regarding the experience of students and course teachers. 40 students filled out a questionnaire before and during their experience with the ChoiCo games. This quantitative data is supplemented with students' self-reflection reports and semi-structured interviews conducted at the end of the semester with both teachers and students. The findings of this pilot study provide an

insight into students' motivations for modifying the games and, their gains from this experience. and The results especially show that how game modding contributes to learning the design thinking methodology by making students more conscious and critical of their choices through selecting and utilising relevant tools that enable them to understand better concepts they are dealing with in their design projects.

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