

Technology Design to Mediate Collaborative Interaction for Future Work - A Teaching Perspective

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Collaboration is one of the most important competencies of the 21st century. With pandemic outbreaks and other global phenomena threatening much of the social cohesion in society, such as climate change, collaboration is likely to receive more attention than ever before. While collaboration skills need to be practiced in many different ways, one pivotal approach will be to develop technologies that support coordination, cooperation and reflective and critical thinking skills, both online and offline. The aim of this position is to contribute with a teaching perspective to the workshop theme. We will briefly report on method and initial experiences from a project aiming to develop and improve the teaching resources for higher education to support students to design technology for collaboration, in future work settings and beyond.

CCS Concepts: • **Human-centered computing** → **HCI theory, concepts and models**.

Additional Key Words and Phrases: HCI, Collaboration, Teaching

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1 INTRODUCTION

Collaboration is considered as one of the 21st century skills [8]. However, collaboration is a very complex skill which involves coordination, cooperation and at its most advanced level, reflective communication [1]. In a time of pandemic, where remote collaboration has become radically more important, the need for designing and developing technologies that efficiently support collaborative interaction becomes a highly prioritized matter. Accordingly, the development of tools and techniques for supporting collaboration through technology is crucial today. Therefore, the ongoing European research project Teaching Design for Collaboration (TEDCO) [17] focuses on developing teaching materials, targeting higher education, in designing technologies that support collaborative interaction mediated by technology (online and onsite, targeted at several different user groups). Designing technology to support effective collaboration practices is especially important during times of increased homeschooling and home office work, but also in future work practices. Additionally, this is also a sustainable future approach, as it will have an impact on our needs for mobility such as traveling, working and studying remotely. Designing technologies to mediate collaboration does not necessarily have to be limited to communication applications such as Skype, Zoom etc, but could also be applied to

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53 emergent technologies such as drones (e.g [4]), games (e.g [7]), collaborative writing (e.g. [12]) and project management
54 tools, online whiteboard applications for visual and creative collaboration, hybrid meeting technologies, and so on. By
55 critically reviewing our own universities' educational programs in technology design located in the north (Sweden,
56 Denmark), central (The Netherlands) and south-eastern (Turkey) parts of Europe, we do not see how technology design
57 for collaborative interaction is part of the educational agenda to any satisfying extent. This is why we see an urgent
58 need for developing teaching materials with a strong focus on technology design for effective collaborative interaction
59 while also including emergent technologies. The aim of the project is to educate responsible and empowered designers
60 of tomorrow with a strong knowledge and emphasis on designing technologies mediating high quality collaboration
61 for all. Our inclusive approach includes targeting and designing technology for people from different backgrounds with
62 different skills, and to develop teaching materials suitable for various higher education contexts across Europe. The
63 more detailed aim of the project is thus to iteratively design, develop, pilot test and implement teaching resources for
64 teaching technology design approaches that address and consider effective forms of collaboration, such as found in
65 Activity theory, educational fields, psychology, design, and human-computer interaction.
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69 Acquiring the skills to design collaborative technologies will be valuable for future practitioners. The main outcome
70 of the project is a set of research-based and practice-tested teaching resources that can be used to update curricula
71 for future professionals within fields of interaction design, information studies, communication design and computer
72 science. The aim is to provide the teachers of those fields (and potential others) with new teaching resources that will
73 enable them to improve their own teaching quality and the learning process. Updating and innovating the curriculum
74 in relation to technology design for collaborative interaction so that higher education remains relevant to labour
75 market and societal needs due to COVID-19 is a crucial aspect for achieving future-ready education and ensuring future
76 practitioners are able to design products, systems, and interactions that support collaboration for the people they are
77 meant to serve.
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80 The direct target group of the TEDCO project is teachers at technology design programmes, such as interaction
81 design, communication design, information studies, and computer science programmes, at university level. Through
82 the teachers' adoption of the outputs of the project we hope to educate students to become designers of tomorrow's
83 work technologies and beyond that support human collaboration practices.
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86 2 INSPIRATION

88 Technologies that support collaborative interaction play an important role in times of pandemics, with reduced mobility,
89 increased homeschooling and home office work. Technology design students have the possibility to make powerful
90 and sustainable changes in society through the design of collaborative technologies. As higher education institutions,
91 we have the obligation to teach our students how to consider supporting collaborative interaction in their technology
92 designs. The focus of the project is thus in line with the 21st century skills [8]. The partner universities have some
93 experience from research into collaborative technology development, such as e.g in the project CITE - Collaborative
94 information technology in special education [5], the project Shareable Dynamic Media in Design and Knowledge [10],
95 REINVENT [14]. However, none of these initiatives have so far provided any teaching materials in order for students to
96 adopt and practice the results from research, something that is highly needed in times of pandemic and in future work.
97 In addition to being innovative through producing new teaching resources in technology development for collaborative
98 interaction, the project partnership aims to place the teaching resources in a sound pedagogical context, taking into
99 account the different pedagogical models represented by the partners from four countries in three different parts of
100 Europe. Inspired by the Erasmus+ project VASE [18], in which more than one of the partners have experience from, all
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105 the materials developed will be packaged as an Open Educational Resource, (OER) and made freely available online for
106 anyone interested in teaching technology design for collaborative interaction.
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108 3 POSITION STATEMENT 109

110 It is our obligations as university teachers and researchers to educate students to become responsible designers of
111 tomorrow's collaborative technologies - at work and beyond. Although there are many examples of research outputs and
112 methods of designing collaborative technologies (e.g. by others [1, 9, 11-13, 15, 16, 19] and by ourselves e.g. [2, 3, 6, 7]),
113 there are less examples of concrete teaching materials for what are relevant aspects to include in a curriculum focused
114 on designing collaborative technologies. Since collaboration is an important but complex phenomena, it has various
115 aspects to consider such as temporality (i.e. synchronous or asynchronous), spatiality (i.e. collocated, remote or hybrid),
116 predictability (i.e. scheduled or unscheduled), level of reality vs. virtuality, purpose (e.g. education, work, entertainment,
117 leisure) as well as the level of collaborative activity that ranges from coordination, cooperation to co-construction,
118 and beyond such as reflective communication triggered by the breakdown situations. Furthermore, when designing
119 collaborative technologies, one needs to take into account the components of collaborative interaction such as the
120 collaborating actors or stakeholders, their roles, values, shared vs. conflicting interests, skills and objects, and the
121 mediating tools, rules and regulations that frame the collaboration. How to describe, analyze, design and evaluate
122 these aspects and components bears importance and needs further investigation. In this workshop, we wish to discuss,
123 network, and seek inspiration for developing such teaching materials, while also sharing the initial results from the
124 TEDCO project in terms of teaching materials and experiences from pilots and interviews, and through that open up
125 for critique. We strongly believe that a teaching perspective will contribute to the workshop.
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131 4 BACKGROUND OF AUTHORS 132

133 At least one of the authors plan to participate on-site in the workshop.

134 Dr. **Eva Eriksson** is an associate professor at the Department of Digital Design and Information studies at AU, and she
135 has almost twenty years of experience from various research projects and teaching in HCI and interaction design.
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137 Dr. **Gökçe Elif Baykal** is an assistant professor at the Department of Communication Design. She holds a PhD in
138 Design, Technology and Society at Koç University, Istanbul. Her research focuses on CCI and on incorporating learning
139 theories into research methods in HCI and interaction design practices.

140 Dr. **Peter Ruijten** is assistant professor on Human-Like Machines within the Human-Technology Interaction
141 research group at the department of Industrial Engineering and Innovation Sciences at TUE. His current research
142 interests include (social) Human-Robot Interaction, Persuasive Technologies, and Trust in Autonomous Vehicles.
143

144 Dr. **Olof Torgersson** is an associate professor at Computer Science and Engineering at GU and Chalmers with over
145 twenty years of experience from research and teaching in higher education. He has been working in a range of projects
146 ranging from logic programming and medical informatics to design for digital seniors and children with special needs.
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