

# Educating Student Teachers for InterProfessional Collaboration through the Codesign of Cultural Heritage with the Use of Augmented Reality (AR) Technology

Gitte Cecilie Motzfeldt  
 Faculty of Teacher Education and Languages  
 Østfold University College  
 Halden, Norway  
 Gitte.c.motzfeldt@hiof.no

Kristine Høeg Karlsen  
 Faculty of Teacher Education and Languages  
 Østfold University College  
 Halden, Norway  
 Kristine.h.karlsen@hiof.no

**Abstract**—In the current study, we focus on student teachers’ perceptions of their involvement in InterProfessional Collaboration (IPC) as part of a mandatory course centered around The Cultural Schoolbag (TCS). The course emerged through collaborative efforts, drawing participants from the fields of education, design, and culture, guided by core principles of participatory design. Our article explores how student teachers perceive their participation, their roles, and responsibilities in promoting democracy, as well as their experiences in facilitating learning processes within their educational context. To analyze student teachers’ active participation in the TCS, we employ an analytical framework that differentiates between three types of democratic participation: “about,” “for,” and “through.” We find that by enhancing student teacher’s ability to contribute to the design of the TCS through the course, they gained firsthand experiences democratic participation. Hence, their autonomy as educators increases, allowing them to voice concerns and foster active learning during their placement.

**Keywords**- *democratic participation; codesign; interProfessional collaboration; cultural heritage; AR technology.*

## I. INTRODUCTION

In a global context, external programs are gaining greater entry into schools. Norway serves as an example, with initiatives such as The Technological Schoolbag, Young Entrepreneurship, and TCS actively engaging with educational institutions. While these programs provide valuable opportunities, they may also vie for precious classroom time, alongside teachers’ current curricula. To address this challenge, integrating InterProfessional Collaboration (IPC) within Teacher Education (TE) has emerged as a promising approach. By incorporating IPC, student teachers gain a deeper understanding of their roles and responsibilities, which empowers them to assert their voices when utilizing activities provided by external associates. Ultimately, this integration ensures that the learning experiences seamlessly align with the school’s curriculum.

The pARTiciPED project [1], led by Østfold University College (ØUC), centers around a groundbreaking cross-sectorial partnership with schools in Norway. At its heart lies The Cultural Schoolbag (TCS) [2], which secured substantial NOK 330 million in government funding in 2023 (28 386 600 euro). Since 2001, TCS has been an integral part of Norway’s cultural policy, enriching pupils’ lives through high-quality art and cultural experiences. These cultural experiences span a

diverse spectrum of forms, including literature, music, film, performing arts, visual arts, and cultural heritage (as outlined in White Paper 18 [3, p. 141]). However, despite its value, TCS faces challenges rooted in inherent power imbalances between schools and cultural institutions. Researchers, such as Christophersen et al. [4], Digranes [5], and Hauge et al. [6], have identified these complexities, emphasizing the need for more research to fully realize the artistic potential within this dynamic partnership.

In the present study, student teachers assume a distinctive role, empowering them to convey a cultural heritage TCS projects using AR, during their placement. This empowerment is facilitated through a collaborative design effort involving stakeholders from the cultural, design, and education sectors. Guided by core principles of participatory design outlined by Kensing and Greenbaum [7, pp. 33–34], these principles were tailored to achieve several objectives, with a key focus on establishing democratic practices. By doing so, the team aimed to equalize power dynamics, ensuring that every participant had a voice. All stakeholders were encouraged to act in both their individual interests and the collective good [7, p. 33]. The primary focus of the current article is to assess the level of participation and action competence acquired by student teachers as they prepare for and carry out the TCS project during their placement. To explore this issue, we formulated the following research question: “What perspectives do student teachers hold regarding their involvement in the TCS project targeting cultural heritage?”

The theoretical framework of this article draws from two key sources in participatory design: John Dewey’s understanding of democracy [10] and Paulo Freire’s insights into adult literacy [11]. These foundational perspectives inform our exploration of democratic participation within the context of our study. Additionally, we employ the analytical framework outlined by Stray and Sætra [9]. This framework categorizes democratic participation into three dimensions: “about,” “for,” and “through.” These distinctions guide our examination of how democratic processes unfold. In Section II, the theoretical grounding and the analytical framework of the analyses are accounted for. Section III we provide an outline of the empirical case, followed by a description of the research design and analysis. In Section IV, we analyze and discuss the empirical evidence considering the theoretical and analytical framework. Finally, in Section V, we draw conclusions and recommendations for future work.

## II. PARTICIPATION IN SOCIETAL INTERCULTURAL COLLABORATION

In the context of participatory design, democratic participation does not occur spontaneously. Instead, it requires deliberate effort. One influential thinker in this realm is John Dewey [10]. His ideas emphasize educating and engaging individuals to act in their own interests while also considering the common good (as discussed by [7], p. 33). Schools hold a crucial position as societal institutions with a democratic educational mandate. Education is essential not only for individual growth, but also for maintaining and actively participating in society. An education system that aims to foster democratic practices must be built on certain foundational principles. According to Dewey [10], equal communication plays a pivotal role. This principle ensures that individuals have a voice and can actively shape both their personal interests and collective well-being within society.

The current article explores the relationships among the pedagogy of the oppressed [11] and participatory design to understand how power dynamics can be aligned by providing student teachers with voice and action competence in the TCS as part of TE. In the twentieth century, the liberation educator Paulo Freire [11] was among those who laid a foundation for understanding power relations, humanity, and dialog for social change, aiming at a better future society. Born in Brazil in the 1960s, he developed an adult literacy methodology that has become one of the most respected pedagogical references in the world [12]. Freire created his liberating pedagogy based on how all people should become equal participants in communities and develop their identities by taking charge of their own environment [11, p. 11]. According to Freire [11], self-determination and codetermination are fundamental to people's quality of life. Unequal democratic practices and power relations make it necessary to transform the context of oppression-oppressors. Equalizing power relations includes finding ways to give a voice to those oppressed by structural conditions and social differences.

In school, Freire [11] points out that students become patient listening objects, while teachers are narrative subjects "filling the students' heads" with their understanding and reality, which might be completely foreign to the students' existential experience (p. 54). In this way, education becomes knowledge from those who "understand it" to those whom they consider completely ignorant. If one regards others as ignorant, this is a characteristic feature of the ideology of oppression. According to Freire, literacy is not only the ability to read and write, but also a transformative medium where individuals, through awareness, authentic experiences, and critical consciousness, might be given the ability to "understand the world". Allowing individuals to critically understand, problematize, and communicate their reality enables the transformation of the oppressed through "dialogical action" [11 p.71]. Dialog and action meet when there is a common desire to express views and transform the world (p. 72).

A goal of democracy education in Norwegian schools is to motivate and prepare students to act. The development of action competence is also linked to studies of power relations in which identifying and assessing alternative actions are important [13]. Mogensen and Schanck [14] discuss action competence as an ideal for education; they state that "action should be addressed to solutions of the problem and should not just be the activities as a counterweight to academic tuition" [14, p. 61]. This is because action competence and action-oriented teaching and learning have important learning potential. Being conscious and purposive might challenge the criteria on which today's education is based. This perspective on the notion of action means that action competence is necessary to change the circumstances that create and sustain challenges in the school system [14]. Hence, action competence can be viewed as a specific activity that potentially leads to increased consciousness and transformation.

### A. Analytic framework

Working with democratic principles, such as equal participation, in the education system means having a conscious relationship with what democratic participation may entail. The analytical framework used in the current study is the three dimensions of teaching democratic participation, outlined by Stray and Sætra [9] and further elaborated by Stray [15], about, for, and through democratic participation. In addition, we emphasize the importance of developing action competence through practical experiences to be able to reflect on and transform current practices.

The starting point is that both democratic participation and actions can be learned [13]. We can differentiate between different dimensions of democratic participation. According to Stray [15], education about democracy means knowledge, that is, about the history of democracy, organizations, and political processes. This is important knowledge for understanding the functions of the society in which we live and become informed citizens. The purpose of education for democracy is for students to develop competence in critical thinking and communication skills [15]. Values and attitudes are explored and developed in the school's learning environment. In the last dimension, education through democratic participation, students acquire experiences of active participation in democratic processes. This implies that the teacher is a decisive participant, supervisor, and facilitator for active participation and for understanding democratic processes in the classroom [9]. We depart from this framework to examine and understand how student teachers, here through participatory approaches, were given a voice to communicate changes in asymmetric power relations when working with TCS and cultural heritage projects in TE and in their placement.

## III. CULTURAL SCHOOLBAGS AS PARTICIPATORY DESIGN INTERVENTIONS

The following section provides an outline of the empirical case, followed by a description of the research design and analysis.

### A. Making use of AR technology in cocreating TCS art projects

The pARTiCiPED project aimed to provide empirical insights into organizing and implementing TCS within TEs. The goal was to empower student teachers as they transition into their roles as future educators. The project established three laboratories, each dedicated to different domains: performing arts, visual art, and cultural heritage. These laboratories served as spaces for exploring the educational practices related to TCS. In the Cultural Heritage Laboratory (CH lab), a design team of four coresearchers planned and organized five workshops together with one museum educator, two teachers, and one student teacher at ØUC. A primary objective was to employ participatory design with the use of serious games to facilitate the collaboration of museum educators, teachers, and students in creating cultural heritage TCS projects.

Furthermore, as part of the HC lab, the design team cocreated and conducted a course design tailored for fourth-year student teachers in TE (ØUC, 2023). The course comprised a total of four seminars. In the course, the student teachers were provided with tools and techniques from participatory design, such as the design card methodology [16]. Additionally, they were introduced to hybrid museum experiences centered around industrial history provided by the local museum, Moss town and industrial museum. Based on this foundation and working closely with the design team, the student teachers were assigned to cocreate a new learning experience (in alignment with [17]). This involved utilizing AR technology via a mobile application to grant pupils access to historical material and opportunities for self-expression within it. This project was integrated into an IPC during the student teacher's placement.

Through this work, we examine the reflective notes created by student teachers after their active participation in co-creating and implementing the project, allowed them to adapt and shape the content of TCS to align with their specific subjects, classes, and interests.

### B. Empirical data and analysis

The pARTiCiPED project has collected extensive data to explore various aspects of IPC within the context of TCS. These contributions include new and innovative methods for TCS in TE [18][19], insights into collaboration between artists and student teachers, highlighting the integration of TCS within everyday learning in schools (see, e.g., [20][21][22]) and negotiating roles [23], and building capacities for artist visits beyond generic knowledge and skills [24].

In the current article, our primary data source consists of reports written by the students upon completion of the course and placement. These reports span a total of 199 pages. The report was divided into two sections: collective and individual. In the collective part, the student teachers collaboratively reflected on their group efforts during the placement. This section provides insights into their joint experiences and observations. In the individual part, each student participated independently. We were particularly interested in their thoughts regarding their own involvement

in the projects. Each report included 14 questions addressing these aspects.

In our data analysis, we followed a three-phase qualitative coding approach inspired by the method proposed by Saldaña [25]. In phase 1, we thoroughly reviewed all the material (199 pages). Our goal was to gain an overview of potential codes and interpretations related to student teachers' involvement and their own thoughts on the process (in accordance with [25], p. 19). We rapidly selected relevant codes, marking text passages within the material (p. 105). Examples of these codes included terms such as "collaboration and mutual support in implementation" and "multiple levels of engagement and action competence." This initial phase was conducted collaboratively, and an interesting observation emerged: Student teachers strongly believed that teachers should play a more significant role in planning and implementing TCS projects. In phase 2, we delved into the textual passages that we had coded in the initial review. Our aim was to organize these passages into a "smaller number of categories" [25, p. 236]. This step helped us prepare for the final phase. In the third and final phase, we realized that the analytical framework proposed by Stray and Sætra [9] could be used to effectively synthesize the material. By applying this framework, we identified emerging patterns and themes related to student teachers' experiences and perspectives.

Upon analyzing the data, a clear pattern emerged. Student teachers, when given the chance to cocreate their own TCS design using participatory design principles, not only encountered a markedly different approach to TCS, but also observed an intentional effort within the CH lab to balance power relationships—a departure from the typical dynamics associated with TCS projects in schools. Power relations are interconnected and complex. It is important to be aware that this analysis simplifies the complexity. Nevertheless, our goal is to shed light on an area that, as far as we know, has received limited research attention. This exploration may contribute with intriguing insights into new ways of understanding TCS and the collaboration between cultural, design and educational domains. In the subsequent sections, we present the results of the analysis and discuss these findings, which are firmly anchored in the research question.

## IV. PARTICIPATION THROUGH THE CODESIGN OF CULTURAL HERITAGE

The TCS aims to democratize access to art and culture for pupils in schools. It operates as a decolonized initiative, ensuring that all students can engage with various professional arts and cultures during their years in school. Teachers play a crucial role in integrating art and culture into the curriculum. Their mission is to make these visits accessible to all pupils, regardless of their backgrounds or abilities [3, p. 136]. However, achieving this goal involves navigating several challenges, especially when considering the democratic values of participation. In most cases, TCSs follow a "top-down" approach, where teachers are informed "about" when and what the TCS project entails by the school management or a coordinator. One of the student teachers reflected on past experiences with TCS: "I have gotten the impression that

teachers experience many TCS projects are just something they need to undertake, without knowing much about them.”

In this framework, teachers are actors who, once informed, can align their actions in accordance with the goals set for TCS. However, there is a risk, as per Freire’s [11] perspective, that the teacher is cast in the role of “uninformed” (cf. [23]); they find themselves in a position where they must accommodate a TCS project that may or may not align with ongoing school activities. However, by enhancing action competence through participatory design workshops, student teachers increase their competence and critically reflect on the learning potential of TCS activities. This process bridges the gap between cultural experiences and the specific situations faced by student teachers in schools. This shift occurs when the focus moves from learning “about” democratic participation, as defined by Stray and Sætra [9], to learning “for” and “through” democratic participation.

When student teachers actively participate in democratic processes, they can critically adjust the TCS project in accordance with their knowledge of the pupils and their learning situations. One of the student teachers commented, “I envision that if teachers at the schools actively involve themes and teaching methods, it may encourage more pupils to drive TCS projects.” Another student teacher put it this way: “I feel this has been a good exercise in making creative plans for the pupils. We have been pushed to think outside the box.” The students’ reflections imply that bridging the gap between cultural expertise and pedagogical knowledge will be advantageous for the TCS project.

Achieving this without expecting (student) teachers to become artists and artists to become teachers but rather allowing them to pursue their own professions (cf. [26]) presents a challenge, but it is essential for meaningful educational experiences for pupils in school. The participatory design process of TCS projects has given student teachers the ability to reflect on their own pedagogical practices. They have gained autonomy in implementing TCS projects related to cultural heritage, which has enhanced their action competence. Additionally, this has enabled them to think creatively and find new ways to engage pupils as active “subjects” in their own learning process. As one student stated, “I strongly believe that the pupils get more out of it and learn more by being a participant yourself.” Another student affirmed, “The own-design TCS project was engaging and dealt with several activities where the pupils could try out something new, discuss, reflect, and try your hand at role-playing.”

According to Freire’s [11] perspective, involvement in work leads to a critical understanding of current practices. Through dialog and action, the student teachers have increased their voices and critical thoughts on TCS projects in school. This process allows them to address structural conditions that prompt democratic values and principles. The pupils do not enter school with empty heads. They are knowledgeable citizens who need to engage themselves in learning processes that not only make them informed citizens but also see different perspectives and critically assess their surroundings through exploratory teaching. This might contribute to developing pupils’ understanding of how to learn

and engage in activities in a wider community context. As one student teacher expressed, “being able to let go of control is an important learning, which gave a new aspect to the learning outcome for us students teachers.” Dewey [10] emphasizes that learning and education are necessary both for individual development and for being active and independent citizens in a democratic society.

The significance of addressing solutions to handle challenges related to activities that counterbalance formal education is underlined by Mogensen and Schanck [14]. We argue that enhancing student teachers’ action competence can be achieved by integrating it into TE programs. Thus, TE can serve as a catalyst for change. One of the student teachers highlighted that “what worked well with the TCS project we developed was that we had collaborated well [among us students] during the preparations, which allowed us to work seamlessly during the TCS project implementation in school.” In the CH lab, these students were tasked with taking part in TCS on their own terms, and we observed an attempt to “level out” power dynamics.

In pARTicipED, student teachers assumed new roles that allowed them to experience and work through democratic participation. Consequently, this experience may empower them to influence the educational system as they transition into school as future professionals. One student teacher expressed this as follows: “... teachers can submit requests for which goals they want the students to achieve and themes that can be used. This will contribute to teachers seeing TCS as something meaningful for the school and not just a ‘happening.’”

Based on this discussion, we have tailored Stray and Sætra’s [9] three types of democratic participation “about,” “for,” and “through” to the context of TE when educating student teachers for IPC with artists and cultural workers as future professionals (see Table 1). We have incorporated strategies that succinctly describe the activities encountered by teacher students during their TE. Furthermore, we have revised and clarified the goals and explanations, drawing on relevant excerpts in our data corpus.

TABLE I. THREE MODES OF DEMOCRATIC PARTICIPATION DURING SCHOOL VISITS

Dimensions	Strategies	Goals	Excerpts
Teaching <i>about</i> TCS project  Knowledge-based competence of the TCS projects and their subject-related content	Student teachers are “handed over” TCS project on campus to take part in, or to be implement as part of their placement.	Students’ teachers acquire knowledge about TCS either during their classes on campus or as part of placement. This knowledge equips them to act in accordance with the instructions provided for TCS in schools.	“I have got the impression that teachers experience many TCS project as just something they need to undertake, without knowing much about them.”
Teaching <i>for</i> democratic participation  Value and attitude competence	Student teachers engage in exploratory teaching. Here, they develop competence in critical thinking and	Student teachers actively cultivate attitudes and values essential for democratic preparedness. Their understanding of the teacher’s role	“... teachers can submit requests for which goals they want the students to achieve, and themes that can be used. This

	communication skills through active communication, sharing their own views, and actively listening to others.	undergoes transformation.	will contribute to teachers seeing TCS as something meaningful for the school, and not just a ‘happening.’”
Teaching through democratic participation – action competence	The student teachers are given opportunities to act as an agent of change, striving to equalize participation and communication of TCS project.	Student teachers develop action competence through experiencing and exploring varied TCS project either on campus or in placement. The experience must create opportunities for the students to participate in democratic processes based on democratic principles when, for example, taking part in or co-designing and implementing TCS projects in schools.	“This was both new for me and for the pupils. It was, therefore, a bit scary to venture out on such a project. Having said that, being able to let go of control is an important learning, which gave a new aspect to the learning outcome for us student teachers.”

V. CONCLUSION AND FUTURE WORK

Teachers play a crucial role in integrating art and culture into the curriculum. The mission of TCS is to make these visits accessible to all pupils, regardless of their backgrounds, interests, or abilities. However, achieving this goal involves navigating several challenges, especially when considering the democratic values of participation. In the future, enhancing the action competence of student teachers can increasingly enable them to reflect on TCS activities, communicate with them, and further develop TCS learning potential. This process bridges the gap between cultural experiences and the specific situations faced by student teachers in school, shifting the focus from learning “about” democratic participation to learning “for” and “through” democratic participation. This perspective aligns with Freire’s [11] concept of adult literacy, which suggests that effective communication with others involves a range of skills beyond reading and writing.

What is intriguing about the participatory design process utilized in the CH lab in the TE is that our students’ teachers gained a significantly different approach to TCS through active involvement. Moreover, based on their participation and input, the student teachers cocreated a digital museum experience for their pupils that they were able to test during their placement. What occurred in the CH lab was an attempt to “level out” the asymmetrical power imbalance to meet the criticism of the TCS, where teachers learn about the TCS project and often feel that they lack the necessary competence to collaborate in equal terms in the TCS project in schools. By collaborating with the design team and peers, the student teachers gained insight into an alternative approach to TCS,

where they experienced significant autonomy, an important aspect of being professional teachers. We argue that when teachers embrace TCSs as future educators, they should not relinquish their autonomy; rather, they should assert it. The following question then arises: How can teachers engage as professional educators in TCS projects in schools without sacrificing their autonomy? We believe that by being “subjects” in their own teaching context and exercising their own action competence through IPC, the potential of TCS can be realized, aligning well with the mandate of professional teachers.

Teachers know their students well and can develop their action competence and critical thinking skills if they are allowed to participate actively in the development of TCS projects, not only by learning about them, but also by instructing them. This had a significant spill-off effect on the involvement of pupils in their own learning process, hence motivating both student teachers and pupils to work with TCS projects on cultural heritage. In this IPC undertaken in TE, student teachers had the opportunity to cocreate their own TCS design based on principles from participatory design, meaning that they were not provided with a preexisting TCS project that they learned about, and were instructed to implement. They worked with participatory principles from which they generated ideas for TCS projects to be further developed for practical use during their placement.

We posit that enhancing teachers’ dialogical actions through IPC not only grants them increased autonomy but also empowers them to assume novel roles as conveyors of art and culture. However, we do not advocate for this approach to replace or supplant traditional modes of museum experiences (or art visits) facilitated by professional cultural workers. Instead, it can serve as a complementary supplement that directly engages teachers and offers a potential avenue for an actual collaboration between culture, and education. Further research on creating “dialogical space” could explore possibilities for articulating such possibilities within the framework of TCS. This might further contribute to transforming the teaching and learning processes of TCS from the more instruction “about” cultural heritage to active participation “for” and “through” their experiences as professions working with TCS projects.

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