12-1-2025

Exploring Educational Crowdsourcing in Schools: Digital Participation Platforms for Hands-On Learning of Democratic Competencies

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Full research paper

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Abstract

Student participation in school decision-making has long been promoted in educational research, yet its implementation remains limited and sometimes symbolic. Educational crowdsourcing, supported by digital participation platforms, offers new opportunities to operationalise student voice through structured processes of contribution submissions (e.g., ideas), deliberation and voting. We explore this phenomenon in the context of aula, a platform adopted in several German schools to enable students to engage in decision-making while learning democratic competencies. Drawing on 11 interviews including teachers from seven schools and a survey of 57 students from one school who utilise aula, we developed a conceptual model of educational crowdsourcing in schools and identified success and failure factors shaping the adoption and sustainability of the concept. Our findings contribute to theory by positioning digital participation platforms as socio-technical learning environments and to practice through design recommendations for integrating such learning approaches into school routines and curricula.

Keywords Educational Crowdsourcing, Student Voice, Digital Participation Platform, Democratic Competencies, Hands-On Learning

1 Introduction

Student participation in school decision-making, for example, to actively shape their environment and be an influential part of it, remains scarce, despite long-standing policy discourses on inclusion and student voice (Gillett-Swan et al. 2025). Educational research has emphasised that enabling young people to articulate opinions, influence decisions and engage in hands-on experience of collective processes is essential to fostering democratic competencies (e.g., Teegelbeckers et al. 2023). Some authors refer to students' abilities to meaningfully participate in collective decision-making, including skills such as deliberation, argumentation, consensus-building and the assumption of responsibility for shared outcomes (Strijbos and Engels 2023). These skills support active citizenship (Anderson and Graham 2016; Taines 2014). Recently, we encountered a phenomenon of educational crowdsourcing that has emerged in several schools to encourage the engagement of (young) students in school decision-making and a democratic framework, similar to the less formalised and digitised concept of educational commons (Moreno-Romero et al. 2024). Educational crowdsourcing includes digital participation platforms that adapt principles from crowdsourcing and digital collaboration to a learning context. One prominent example that we focus on is aula, which stands for a non-profit organisation, a concept and a platform developed in Germany that is supposed to be utilised for students in the primary and secondary education (usual age group from 6 to 19) to propose ideas, deliberate collectively and vote on ideas that can positively affect their school life, and they wish to be realised. Several schools have begun experimenting with this concept and such digital participation platforms, treating them as a playground where students can learn democratic competencies and take on responsibility. Yet, despite this phenomenon, there is little research about how these digital platforms work in everyday school life, what (learning) impact they have and how they are experienced by teachers and students.

The inherent role of digital participation platforms in the aula concept is essential: they are supposed to empower students, democratise (decision-making) processes and serve as hands-on learning tools for democratic engagement. This can foster digital citizenship as Vallès-Peris and Domènech (2024) mention. From an Information Systems (IS) perspective, these platforms resemble crowdsourcing platforms in which contributions (e.g., ideas, proposals and votes) from many actors (e.g., teachers and students) are aggregated to shape organisational outcomes and development. However, combined research on digital participation and crowdsourcing is scarce and highlights recurring challenges that may also be transferable to school environments (Jiang et al. 2018; Tyrrell and Shalavin 2022). For example, sustaining engagement of the actors over time (Garaus et al. 2025), ensuring that contributions lead to visible and successful outcomes (Brugliera 2024), managing the workload of reviewing and implementing proposals through dedicated personnel (Bhatti et al. 2020) and reducing technical or organisational frictions (Mustafa et al. 2024), such as inadequate integration into routines or slow feedback loops. While such success and failure factors are increasingly understood in organisational contexts (e.g., employee-driven innovation (Leible et al. 2023; Opland et al. 2022)), schools constitute a distinct environment with different goals, constraints and objectives (Meuser et al. 2023)).

This study focuses on the aula concept and platform. Therefore, we examine how digital participation platforms function in practice within schools and how they can support or hinder the development of democratic competencies among students. Although the notions of student voice and participatory learning are established in educational research (Charteris and Smardon 2019; Dara and Kesavan 2025; Ralph 2021), there is still a lack of (IS-informed) empirical studies examining how digital participation platforms are implemented, used and experienced in schools. Furthermore, there is in our knowledge no established model that captures this underlying socio-technical phenomenon and demonstrates how such platforms influence student engagement and the development of democratic competencies. This motivates our research question (RQ):

How can digital participation platforms in schools be conceptualised and designed to foster student engagement and democratic competencies?

To address this RQ, we conducted a multi-method study of the aula concept and platform, which we treated as a representative case of digital participation in schools and the phenomenon of educational crowdsourcing for democratic competencies. Our data collection combines perspectives from different stakeholders in two data collections. (1) We conducted 11 interviews following the method of Meuser and Nagel (2009) including eight teachers of seven schools that currently utilise or utilised aula and asked about their motivations, goals and experiences with the adoption, success and challenges of the concept and platform. Furthermore, two interviews were conducted with the CEO and project coordinator of aula as a non-profit organisation, who provided insights into the conceptual rationale, design intentions and observations from multiple implementations. The last interview was with a student representative in a school where the initiative of implementing aula came from the students.

(2) We complemented the interview data with a survey oriented on questions based on UTAUT2 items (Venkatesh et al. 2012) with 57 students in a secondary school utilising aula and captured their perceptions, usage patterns and learning experiences. We deliberately approached aula not as a platform evaluation, but with an empirical lens to investigate how participation platforms with an (educational) crowdsourcing approach operate in school environments and how their embedded processes support or hinder the hands-on learning of democratic competencies. Since aula stands for three elements (organisation, concept and platform) the term will be used hereafter to refer to the aula participation platform, unless otherwise specified. Based on our results, we present the following contributions: (1) a conceptual model of digital participation as a learning measure for democratic competencies, (2) empirical insights into success and failure factors involved in adopting and using the aula concept and platform and in digital participation in schools in general and (3) a positioning of these findings within the literature on student voice, hands-on learning and crowdsourcing.

2 Theoretical Background

2.1 Student Voice

The concept of student voice refers to the recognition of students as active stakeholders in their learning environment, whose perspectives, ideas and experiences can shape both teaching and institutional decision-making (Cardiff et al. 2023; Conner et al. 2015). Research has emphasised that student voice contributes to the development of agency, inclusivity and democratic competencies by giving young people opportunities to articulate opinions and participate in decisions that affect them (Holquist et al. 2023; Mitra 2004). At the same time, critical studies caution that participation can remain symbolic or tokenistic, generating limited impact on actual decisions and risking disillusionment when students' contributions are not taken seriously (O'Reilly and O'Grady 2024). Thus, while the normative rationale of student voice is well established, its effective realisation in schools remains challenging.

The aula concept and platform for digital participation can be understood as an attempt to operationalise student voice in a structured and transparent way that pursues a learning goal at its core. While the aula concept represents the broader pedagogical and democratic framework aimed at fostering participation and democratic competencies, the aula platform serves as digital tool, providing the technical means to implement the concept. By embedding mechanisms for idea submission, deliberation and collective decision-making, the platform moves beyond ad hoc consultation towards routinised processes that are intended to strengthen the visibility and impact of students' contributions. In this sense, they extend existing work on student voice by providing socio-technical infrastructures for participation. Yet, empirical knowledge is limited on how such digital systems influence the scope, quality and outcomes of student voice in practice. Our study addresses this gap by examining how a participation platform supports or constrains students' ability to engage in decision-making and to develop democratic competencies through hands-on experiences.

2.2 Hands-On (Constructivist) Learning

Hands-on (constructivist) learning emphasises active engagement, experiential practice and reflection as means for developing knowledge and skills. In educational research, it is closely linked to constructivist traditions, which view learning as a process of doing and making rather than passively receiving information (Do et al. 2023; Kolb 1984). Within civic and democratic education, scholars have argued that participation in authentic decision-making processes fosters (democratic) key competencies such as negotiation, deliberation, shared responsibility and collective problem-solving (Strijbos and Engels 2023; Teegelbeckers et al. 2023). By allowing students to propose ideas and contribute to real issues that affect their school environment and community, hands-on participation helps them internalise democratic norms and develop a sense of efficacy in moving their initiatives forward.

Digital participation platforms can extend this pedagogical logic into virtual spaces, offering concrete opportunities for idea management (e.g., Selfa-Sastre et al. 2022 in language education) for students and teachers. The framework that is constructed with a central place for submitting, discussing, voting and evaluating ideas resembles democratic practices in wider society and can thus function as a form of experiential civic education within schools. However, while the literature on student voice highlights the importance of authentic (hands-on) participation (e.g., O'Reilly and O'Grady 2024), there is still limited research on how digital tools specifically enable the learning of democratic competencies in younger student populations. By focusing on the use of such a platform, our study explores how hands-on digital participation contributes to democratic learning in primary and secondary school contexts.

2.3 Crowdsourcing and Digital Participation

Crowdsourcing refers to the practice of mobilising groups of people to generate ideas, solve problems or contribute resources, often mediated by digital platforms (Prpic and Shukla 2014; Sood et al. 2021). Research on crowdsourcing and related concepts such as (bottom-up) employee-driven innovation has highlighted recurring success factors: low entry barriers for participation, intrinsic motivation among contributors, quick feedback mechanisms and visible outcomes that demonstrate contributors' impact (Opland et al. 2025; Rechenberger et al. 2015). Conversely, failure factors include bottlenecks in decision-making, unclear ownership of ideas, participation fatigue and invisibility of contributions when feedback or implementation does not occur (e.g., Leible and von Brackel-Schmidt 2025).

In parallel, the literature on digital participation emphasises the role of technology in extending opportunities for civic engagement and decision-making. Digital platforms can lower barriers to entry, increase transparency and give visibility to voices that might otherwise remain unheard (e.g., Shin et al. 2024 in citizen participation). At the same time, participation that remains purely symbolic, where contributions are collected but not acted upon, can undermine trust and reduce long-term engagement (Boeckmann and Tyler 2002). Effective digital participation therefore requires not only technical usability but also organisational embedding, ensuring that contributions are processed, acted upon and integrated into decision-making structures.

The aula concept and platform combine these two approaches. On the one hand, they resemble crowdsourcing systems, where students act as contributors and voters, who democratically vote for ideas they want to support and school leadership or teachers evaluate contributions. On the other hand, platforms function as learning environments for democratic participation, where students experience processes such as proposal submission, deliberation, voting and feedback. Despite this potential, empirical studies of crowdsourcing for educational purposes in schools are rare, and little is known about how digital participation platforms function in such environments with younger students. Therefore, our study analyses how the aula concept that combines student voice, hands-on learning and digital participation platforms in a crowdsourcing setting operates in practice.

3 Method

Given the novelty of the concept and scarcity of empirical evidence, this study adopts a phenomenon-based research approach (Krogh et al. 2012; Leible et al. 2025), focusing on real-world instances of an emerging socio-technical approach. Our aim was to explore how participation platforms such as aula are implemented, experienced and understood in practice, and to conceptualise their role in fostering student engagement and democratic learning. To capture this complexity, we employed a multi-method design that combined qualitative interviews with predominantly teachers, as well as a survey with students. This design allowed us to triangulate perspectives from the actors involved in the created democratic framework, providing a holistic view of the phenomenon.

The core of our empirical material stems from overall 11 interviews with eight teachers from seven schools who had direct experience with aula by utilising it. Furthermore, two individuals from aula as organisation were interviewed (the CEO and project coordinator) and one student who led an initiative to adopt aula in his school. Following the methodological approach of Meuser and Nagel (2009), the interviews aimed to reconstruct the interviewees' tacit and procedural knowledge. Consequently, we approached teachers as experts in the sense of possessing context-specific knowledge about how participation unfolds in practice with aula and how the platform is embedded in school routines. The interviews focused on motivations for adoption, goals, successes and challenges encountered and reflections on the aula platform's role in student participation and learning. To achieve this, we employed a semi-structured interview guide: a predefined set of open-ended questions designed to ensure comparability across interviews while allowing flexibility for participants to elaborate on their experiences. The guide encouraged reflection on concrete experiences, challenges and highlights with aula, while giving participants space to articulate their own perspectives. Each interview lasted between 45 and 76 minutes (average: 60 minutes), was recorded and transcribed via the software MAXQDA and subsequently anonymised for analysis. Table 1 provides an overview of all interview partners, including their institutional affiliation and ID which is later used for references to the individual interviews.

To complement the organisational teacher perspectives captured in the interviews, we conducted a survey with 57 students at one secondary school that has implemented the aula concept and platform for two years. The surveyed group consisted of students in the age range of 10 to 12 years (grades five and six), representing the lower secondary level in Germany. The items were adapted from validated constructs of the UTAUT2 model (Venkatesh et al. 2012) with a German translation for the target group

(Harborth and Pape 2018), focusing on effort expectancy, performance expectancy, hedonic motivation, self-efficacy, and behavioural intention in connection to aula. To fit the age group of 10–12, the items were simplified in wording (e. g., no complicated or complex words) and reduced in length (e.g., only one statement in an item instead of two or more) to foster their understanding, following recommendations for survey research with younger respondents (Borgers et al. 2000; Scott 2008).

ID	Institution	aula Status	Role	Interview duration
1	School 1	Cancelled	Teacher (Geography, History, Math)	76 minutes
2	School 2	Active	Student	51 minutes
3	School 3	Introduction	Teacher (History, Civics, Sports)	52 minutes
4	School 3		Teacher (French, Sports)	52 minutes
5	School 3		Teacher (Civics)	58 minutes
6	School 4	Active	Teacher (German, Civics, Economics)	68 minutes
7	School 5	Active	Teacher (Physics, Math)	45 minutes
8	School 6	Active	Teacher (Math, History, Chemistry)	60 minutes
9	School 7	Active	Teacher (Physics, Math)	73 minutes
10	aula	-	CEO	64 minutes
11	aula	-	Project Coordinator	64 minutes

Table 1. Overview of Interview Participants and their Affiliations.
Note: 'aula Status' refers to the current implementation phase

The survey was administered physically in small groups of two to three students at a time in a separate room to provide a calm and supportive environment. Conducting the survey in these small constellations, rather than in a full classroom, helped reduce performance pressure from the larger peer group and supported every voice to be heard, while still allowing students to feel comfortable answering the questions alongside familiar classmates (Punch 2002). Students completed the survey orally with one neutral person present who asked the questions and was not a member of the school. There was no presence of teachers or other school staff, ensuring that the responses of the students reflected their own perceptions rather than social desirability. The data collection took place over the course of two school days during regular lecture times, ensuring a high participation rate. Table 2 provides an overview of the demographic characteristics of the students participated, including age, gender and class level.

Category	n	%
Gender		
Female	28	49
Male	29	51
Class level		
Grade five	37	65
Grade six	20	35

Table 2. Demographic Overview of Survey Participants (n = 57)

4 Results

4.1 From Crowdsourcing to Learning: A Conceptual Model

The conceptual model derived from the collected data of our study captures digital participation platforms as socio-technical systems that channel distributed contributions (e.g., ideas) into both organisational and learning outcomes (e.g., implemented ideas and democratic competencies). At an abstract level, the model (see Figure 1) is structured around three dimensions: key conditions/enablers, the participation process, and key outcomes. The conditions provide the socio-technical and organisational foundation that allows participation to unfold. The crowdsourcing-based process illustrates how individual contributions are transformed into collective decisions and actions through sequential stages of submission, voting, evaluation and implementation. The outcomes highlight the dual potential of such hands-on approaches: they may generate tangible organisational improvements

and serve as environments for experiential learning, where participants develop competencies such as collaboration, negotiation and responsibility. Importantly, the model also incorporates feedback and recursive cycles, emphasising that participation is not a one-off event, but an iterative dynamic where successes and failures shape future engagement.

By design, the model is generalised and transferable. It does not prescribe how a particular platform (such as aula) must be used but rather illustrates the underlying logic of such a platform as participation system. This abstraction is intended to manifest the phenomenon in a processual form and allows the model to be applied in schools, workplaces or civic organisations, while still accounting for contextual variation. For instance, an institution may emphasise learning outcomes, using the process primarily as a means of democratic education and empowerment, as in our study with schools, or it may prioritise organisational outcomes, focusing on innovation, efficiency or responsiveness.

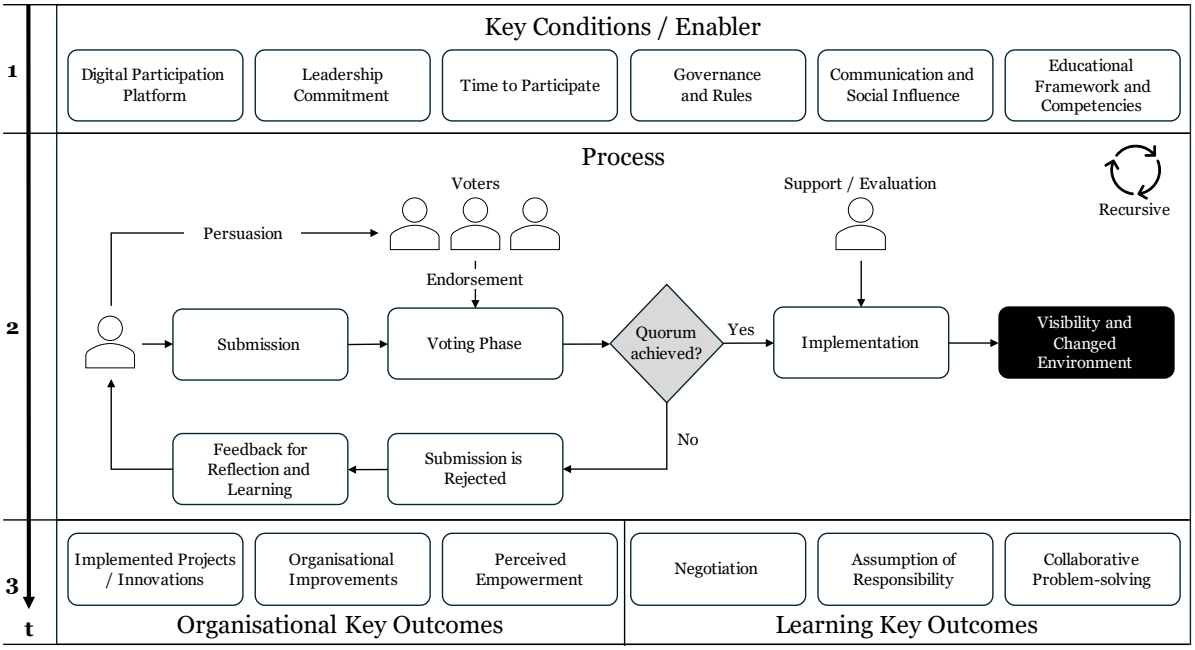

Figure 1: Conceptual Model of the Phenomenon of Educational Crowdsourcing in Schools

In school contexts, the model demonstrates how digital participation platforms can be implemented as structured environments for student involvement following crowdsourcing mechanisms. Conditions such as allocated participation time, governance and rules as a utilisation framework and accessible technical infrastructure create the baseline for meaningful use. Within the process itself, students start by proposing contributions via the participation platform. They can choose whether they submit them in the allocation spaces: *class*, *grade* or *school*. This exemplary instantiation of allocation spaces for contributions can be seen in Figure 2 as an onion diagram.

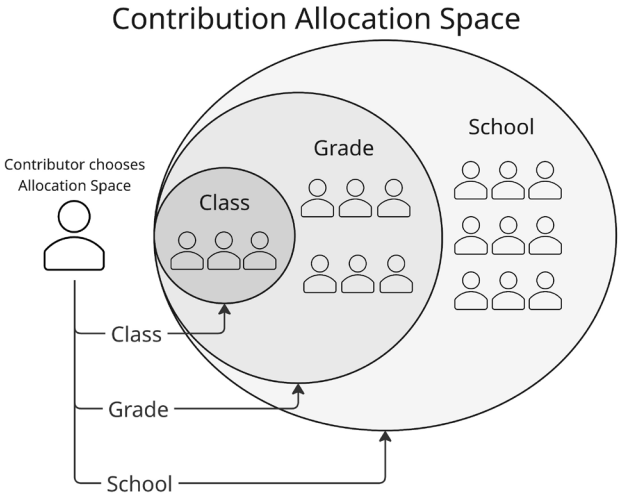

Figure 2: Contribution Allocation Spaces based on the Influence Area of a Contribution

Class means that the contribution impacts the specific class in which the contributor is (e.g., classroom equipment, excursions), and only the classmates see the contribution and are eligible for voting. *Grade* stands for all classes on the same level, for example, the sixth grade (e.g., grade-wide events) and all students in this class level can see the contribution and vote about it. *School* means that the contribution affects all students (e.g., cafeteria, timetable, infrastructure), so all are eligible to vote about it. Voters can constitute a homogeneous group (e.g., students from the same class) or a heterogeneous group (e.g., students from different classes and grades, with teachers possibly participating as well).

Every allocation space should be carefully thought through regarding the quorum thresholds needed so that a contribution like an idea gets implemented. This threshold needs to be calculated differently, in view of the number of individuals acting in the democratic system, the difficulty to reach and convince them and the basic number of non-voters. Even where proposals are not successful, the feedback and reflection mechanisms are crucial, as they transform potential failure into a learning opportunity. This cyclical dynamic ensures that participation remains not only a mechanism for generating organisational change, but also a formative experience that fosters democratic competencies. Importantly, the process should be recursive: insights and learning from one participation cycle feed back into subsequent rounds of idea generation and engagement, reinforcing both individual and collective learning over time.

The conceptual model also highlights that different focus areas exist. When schools prioritise learning outcomes, as in our study, the process is embedded within curricula, framed explicitly as an exercise in civic education, and used to foster negotiation, responsibility and collaborative problem-solving. When organisational outcomes are prioritised, emphasis is placed on efficiency, responsiveness and the tangible implementation of student-led innovations that improve school life. Both pathways are valid and shown by the model to provide a lens for navigating such choices.

4.2 Insights from the Interview Study

Across the interviews, teachers described a mixture of pedagogical and organisational motives for adopting the aula concept and participation platform. Several highlighted the opportunity to strengthen democratic competencies by allowing students to experience decision-making processes directly and visibly, rather than through traditional representative structures like student councils (I2, I3). In some schools, the explicit goal was to provide a more systematic and transparent channel for student voice, enabling contributions from those who would otherwise remain unnoticed in class contexts (I3, I9). A few emphasised the platform's potential to promote responsibility and agency among students, including those who were typically less active, as one teacher noted that otherwise quiet individuals were able to bring forward impactful ideas (I8, I9). From an organisational perspective, the tool was viewed as a way to collect, cluster and evaluate contributions more efficiently (e.g., due to a central digital platform) and to make school development processes more transparent (I2-I3, I5). Some interviewees also linked adoption to broader strategic efforts to modernise teaching and embed digital tools, with the platform serving both as an innovation and as a media education instrument (I4). At the same time, adoption was not always unanimous: in some cases, scepticism among teacher colleagues or lack of prioritisation meant that initial buy-in had to be carefully negotiated (I1, I4, I9).

Across the schools, interviewees consistently highlighted the increased transparency of student input as a central benefit. Teachers and the student noted that the platform allowed them to see ideas and concerns that would otherwise have remained invisible (I2, I3, I8-I9). For example, one teacher reported that within just a few days of implementation, students submitted more than eighty ideas, many of which surfaced new perspectives and needs (I3). Importantly, even proposals that did not reach the quorum threshold could stimulate reflection and dialogue; in one case, a school leadership team considered adopting an idea despite its formal rejection because of its perceived value (I3). The interviewed student further emphasised that the system enhanced the visibility of student councils' work, making deliberations and outcomes more transparent to the wider school community (I2).

In addition to organisational transparency, the platform was regarded as a powerful enabler of student agency and learning opportunities. Teachers observed that participation processes encouraged students to take ownership of ideas and develop key democratic competencies such as negotiation, responsibility and collective problem-solving (I2-I4, I8-I9). In some instances, students who were usually less engaged or even perceived as disruptive in traditional classroom settings became active contributors once they had the chance to pursue their own proposals (I8-I9). The platform also opened up new possibilities for integrating media literacy and digital communication skills into classroom practice, for example by reflecting on the quality of online discussions and the norms of respectful interaction (I6). Several teachers highlighted that students found the platform both useful and enjoyable to use (I3-I4, I9), suggesting that such systems can successfully combine crowdsourcing and participation with experiential learning in a digital environment.

Despite the positive experiences, interviewees pointed to a range of challenges that complicated the use of the platform in everyday school practice. A recurring theme across nearly all interviews was the presence of technical problems, particularly the absence of a simple password reset function at the time of adoption, which often led to lost access and directly hindered participation and quorum attainment (I2-I3, I5, I7-I8). Teachers and the student also highlighted the slowness of processes, where the time needed to gather support and move from quorum to implementation stretched out, causing some ideas to lose momentum or become irrelevant (I2-I3, I8-I9). This could be further exacerbated by long school holidays or the departure of key students, which interrupted the continuity of idea development (I4, I8), as well as missing support in the conception and implementation phase (I3, I8-I9).

Another central issue was the lack of sufficient time and resources allocated for participation. All teachers noted that measures like 'aula-hours' — dedicated classroom sessions for working on contributions to submit on the platform — were essential to keep engagement alive, but these were often irregular or deprioritised due to the absence of time capacities or in favour of exam preparation and curriculum demands (I1, I3-I9). While some schools organised aula-hours centrally and observed positive effects and correlations on activity (I2-I5), others struggled with inconsistent implementation or lack of buy-in from colleagues, which undermined overall effectiveness, as there was no control over whether the aula hours were conducted (I1, I7, I9). Finally, several teachers reflected that the absence of concrete success stories, where student contributions and ideas were visibly implemented, led to frustration among students and the risk of reinforcing scepticism about whether participation could really make a difference (I1, I5, I7-I9). This achieves the opposite of the intended learning goal: namely, questioning the democratic process and participation.

The interviews with the CEO and the project coordinator (I10-I11) provided a complementary perspective, emphasising both the strategic orientation and the practical challenges of scaling aula. From their point of view, the success of digital participation in schools depends less on the technical tool itself and more on how it is integrated into school culture and routines. They stressed the importance of preparatory processes such as school-wide agreements (aula contracts) and dedicated time slots — aula hours — to embed participation into everyday practice, alongside support structures such as mentors and teacher involvement to foster idea conception and implementation (I10). They acknowledged that insufficient organisational embedding, lack of teacher buy-in, or missing resources (e.g., time, infrastructure, moderation) often led to stalled adoption, regardless of the software's technical functionality (I11). They further highlighted efforts to improve the system, including the exploration of new decision-making mechanisms such as delegated voting (I11). It was underlined that the platform is in its core a learning environment for democratic competencies, making early success stories and visible implementations essential to sustain engagement among students and schools alike (I10-I11).

4.3 Insights from the Student Survey

The survey aimed to capture students' experiences and perceptions of the platform in one school, with a focus on aspects such as ease of use, self-efficacy, usefulness, enjoyment, collaboration, and behavioural intention to use. Short and age-appropriate items were used, many of which were inspired by the established IS model UTAUT2 (Venkatesh et al. 2012) but adapted to the school context to ensure comprehensibility. The survey was administered during classroom hours in small groups of two to three students with responses recorded individually on a 7-point Likert scale. An exception is question 6, which was answered by "yes" (1) or "no" (0). Table 3 provides an overview of the descriptive results.

Overall, students rated the platform as easy to use ($M = 6.05$, $SD = 0.83$) and expressed high self-confidence in their ability to participate by writing comments and submitting ideas ($M = 6.19$, $SD = 1.25$). These consistently high values across both grades suggest that even younger students quickly developed the skills and confidence required to use aula effectively. Access to devices was also reported as largely unproblematic, with nearly all students confirming that they had the necessary technical equipment ($M = 6.93$, $SD = 0.26$). These results indicate that technical usability and basic participation competence were not barriers in this school setting, laying a stable foundation for further engagement.

Beyond usability, students perceived the platform as useful for achieving meaningful goals ($M = 5.82$, $SD = 1.03$) and enjoyable to use ($M = 5.30$, $SD = 1.12$). These values underline that these students not only recognised the instrumental value of participation but also associated it with fun and motivation, which is essential for sustaining engagement over time. Collaboration, however, received somewhat lower ratings ($M = 3.12$, $SD = 2.04$), indicating that while students did participate individually, the platform was less frequently experienced as a space for collective idea generation with peers. Grade 6 students reported marginally higher ratings for usefulness and fun than grade 5, while collaboration remained comparably weak in both groups. This points to the importance of scaffolding collaborative use, for instance by embedding platform activities into group projects or classroom discussions.

#	Item	Grade 5 [M]	Grade 6 [M]	Overall [M]	Overall [SD]
1	I use the aula platform regularly.	2.57	3.55	2.91	1.39
2	I find the platform aula easy to use.	6.03	6.10	6.05	0.83
3	I feel confident enough to participate on the aula platform, write comments, and contribute my own ideas.	6.16	6.25	6.19	1.25
4	Using the aula platform increases my chances of achieving things that are important to me.	4.92	4.80	4.88	1.23
5	I promote ideas on aula.	2.35	2.20	2.30	1.88
6	I try to convince and win friends for my proposed ideas.	0.68	0.95	0.77	-
7	I find the platform aula useful.	5.68	6.10	5.83	1.03
8	Using the platform aula is enjoyable.	5.30	5.30	5.30	1.12
9	I work with my classmates to find and develop ideas for aula.	3.41	2.60	3.12	2.04
10	Please select how often you use the aula platform.	2.08	3.15	2.46	1.20
11	People who are important to me are happy when I use aula, e.g., parents, teachers, friends.	2.87	2.75	2.83	1.96
12	I have the necessary equipment to use the aula platform.	7.00	6.80	6.93	0.26
13	I plan to continue using the aula platform regularly.	4.27	4.85	4.47	1.65

Table 3. Descriptive Results of the Student Survey

At the same time, several items reveal tensions and limitations. Regular usage was rather low (M = 2.91, SD = 1.39), as was the reported frequency of use (M = 2.46, SD = 1.20). Similarly, students were hesitant to actively promote their own or others' ideas, with low averages for "advertising ideas" (M = 2.30, SD = 1.88) and "mobilising friends" (M = 0.77). These findings indicate that while students recognised the platform's value, sustained participation and peer mobilisation were less common. Nonetheless, intention to continue using the system was moderate to positive (M = 4.47, SD = 1.65), suggesting potential for longer-term adoption if accompanied by visible outcomes and structured integration into school routines. Together, the survey results reflect both the promise of digital participation platforms in fostering democratic competencies and a sense of agency, and the challenges of sustaining consistent, collaborative engagement among younger students in a crowdsourcing initiative.

4.4 Success and Failure Factors in Practice

The real-world instantiations from the conceptual model (Subsection 4.1) point to a set of recurring conditions, patterns and mechanisms that determine whether the concept is successful or fails based on the collected and analysed data from the interviews (Subsection 4.2) and the student survey (Subsection 4.3). While the schools in our study implemented the aula concept in varying ways, a cross-case comparison reveals common themes across adoption, use and sustainability. To synthesise these insights, we identified success and failure factors and developed design recommendations that can guide the implementation of educational crowdsourcing approaches like aula. These factors are summarised in Table 4, which distils the empirical lessons into transferable guidance.

The interview data strongly reinforce the importance of organisational embedding and facilitation. Teachers reported that success was most likely when there was strong buy-in from leadership and colleagues, coupled with the assignment of clear facilitator roles (I2, I3, I6, I8). Where such support was lacking, implementation quickly became fragmented and inconsistent, with some classes participating actively while others disengaged altogether (I1, I7, I9). This suggests that teachers in particular have a major influence on the use and success of aula as a concept and platform. Structured aula hours proved to be an especially critical success factor. Schools that set aside regular time slots within the timetable sustained engagement more effectively than those that left participation to voluntary use during breaks or at home (I2, I4, I9). Quick wins also emerged as a decisive mechanism: when students could see that proposals were implemented within a reasonable time frame, motivation and trust in the process increased (I1, I5, I8-I9). By contrast, long delays, lack of feedback, or the quiet abandonment of proposals often reinforced students' scepticism that their voices would not be taken seriously (I1, I5, I7-I9). These patterns underline the statements of the aula CEO and project coordinator that the success or failure of such educational crowdsourcing approaches in schools depend not simply on the presence, easy accessibility and adequate functionality of a digital platform but on its integration into everyday school routines and governance processes by teachers.

Success Factor	Failure Factor	Design Recommendations
Strong teacher buy-in and leadership support	Lack of buy-in from colleagues; inconsistent facilitation	Secure organisational commitment and assign clear facilitator roles
Structured participation time (e.g., aula hours)	Participation relegated to "free time" with irregular, low use or none at all	Embed participation in schedules to ensure continuity
Quick wins and visible outcomes (especially after the introduction)	Lack of feedback and visible implementation leading to frustration, disengagement	Provide early successes and transparent communication of results
Integration into curriculum (civic education, media literacy)	Treated as add-on, disconnected from learning goals	Link participation activities to curricular objectives
Accessibility: easy login, sufficient devices, user-friendly interface	Technical barriers (password reset issues, poor infrastructure)	Guarantee low technical access barriers to a central platform and, when needed, support for it
Student multipliers and communication measures (posters, public displays, peer promotion)	Low awareness of proposals; weak mobilisation of peers	Strengthen visibility through peer ambassadors and communication channels
Balanced governance (reasonable quorum thresholds, timely reviews)	Excessive quorum requirements; slow feedback loops	Calibrate thresholds and guarantee timely, transparent feedback

Table 4. Success and Failure Factors and Design Recommendation for Educational Crowdsourcing

The student survey provides additional nuance to these findings. Students rated usability and self-efficacy highly (mean values above 6 on a 7-point scale), confirming that basic technical barriers were minimal in this school context. This aligns with teacher observations that once login and device access were secured, students were able to use the platform independently (I3, I8, I9). However, the survey also revealed weak scores for collaboration (M = 3.12) and mobilisation of peers (M = 0.77), reflecting a lack of collective idea development and low visibility of proposals among students. This corresponds to interview accounts that communication measures and student multipliers were necessary to increase reach and sustain activity (I2, I4-I5). Similarly, low reported frequency of use (M = 2.46) and modest intention to continue (M = 4.47) highlight the risks of disengagement when proposals are not visibly acted upon. Together, these findings corroborate the role of communication, visibility and timely feedback as central design levers, confirming the patterns identified in Table 4.

Viewed through the lens of the conceptual model introduced in Subsection 4.1, these results confirm the central role of enabling conditions and iterative feedback loops. Strong organisational and pedagogical conditions — leadership commitment, dedicated participation time, curriculum integration — create the foundation on which the participation process can function. The stages of idea submission, support, quorum and review operate effectively only when students perceive that their contributions are visible and that outcomes are acted upon. Where this feedback loop breaks down, disengagement sets in, leading to a balancing rather than reinforcing cycle of participation. Both the interviews and the survey highlight how success depends on aligning platform use with the lived routines of the organisation: participation cannot be treated as an add-on but must be embedded within broader structures of governance and learning. The findings therefore empirically support the model's proposition that related digital participation platforms are not self-sustaining artefacts, but socio-technical systems shaped by organisational conditions and recursive dynamics, which are also crucial to their success.

5 Discussion and Conclusion

Addressing our RQ, the empirical evidence collected from the interviews, along with students' survey responses demonstrates that platforms such as aula can promote both organisational responsiveness and the development of democratic competencies (e.g., responsibility, deliberation, agency). However, these outcomes depend heavily on the presence of enabling conditions, for example structured participation time, leadership commitment and timely feedback cycles. Where these conditions were weak or absent, even well-designed tools failed to maintain usage or translate into learning experiences.

Although two potential orientations of the conceptual model — organisational innovation and educational learning — could be emphasised, our study confirms that centring the platform around learning outcomes is both feasible and compelling in schools. Students are capable of engaging meaningfully when given low-friction access and when their ideas are taken seriously. At the same time, organisational improvement tends to follow only when schools align platform use with governance and routines for all actors involved. These findings resonate with the notion of participatory technologies as

socio-technical systems. Their success is shaped not just by features, but by how they are embedded in organisational contexts, cultures and processes (Govers and van Amelsvoort 2023). They also underline that digital participation must be pedagogically framed, not treated simply as an administrative tool.

The study contributes to theory by positioning educational crowdsourcing in a school with a young age group as a form of digital participation that is both socio-technical and pedagogically embedded. While existing research on (educational) crowdsourcing in IS has emphasised success factors such as low entry barriers, visibility of contributions and transparent follow-up (Benbya and Leidner 2018; Jiang et al. 2018; Opland et al. 2025; Rechenberger et al. 2015), our findings highlight how these mechanisms require adaptation in school contexts with learning goals. For example, the importance of structured aula hours and curricular integration reflects an educational framing that is identified as a key activity, detached from technical aspects, to foster the success of an educational crowdsourcing approach. Jones and Hall (2022) argue that student voice can only be given meaning if it is integrated as substantial part of everyday practice, which is shown by many statements in our interview study. The mere hull of technical functionalities in a platform is not enough to successfully implement concepts as aula. The collected data strongly suggests that the social component (e.g., persuasion and communication) is much greater, as the utilised technical systems are quite simple. Taken together, these insights highlight that the effectiveness of digital participation in schools depends less on technological sophistication and more on their alignment with pedagogical intentions and constructivist learning practices.

While prior work has underscored the value of enabling young people to articulate opinions and influence decisions (Cardiff et al. 2023; Mitra 2004), less is known about the role of digital platforms as central mediating infrastructures for such participation in educational crowdsourcing settings. Our study shows that platforms can operationalise student voice function-wise through transparent processes of idea submission, quorum thresholds and feedback. Moreover, the results demonstrate that new competencies emerge not automatically but when participation is structured, visible and supported, aligning with constructivist ideas of learning as active engagement (Daoayan Biaddang and Caroy 2024).

For practice in schools, the results underscore that digital participation platforms must be treated not as standalone tools but as embedded educational practices. Teachers and school leadership should secure organisational commitment by clarifying facilitation roles, setting up a governance and integrating participation into timetables, for example through regular aula hours. Early quick wins are essential to sustain student trust and motivation, making it critical that at least some ideas are implemented visibly soon after introduction. Furthermore, embedding the platform into curricular domains such as civic education and media literacy ensures that students not only use the system but also reflect on its democratic and communicative dimensions. These steps can help schools integrate concepts like aula and leverage related participation platforms as spaces for cultivating democratic competencies rather than as isolated digital tools. We further suggest that low effort controlling mechanisms (e.g., integration in timetable or an (automated) lightweight reporting) for teachers should be established to ensure that aula hours are conducted regularly and meaningfully.

Beyond schools, the findings provide guidance for practitioners designing participatory systems in other organisational settings such as business-oriented workplaces (Benbya and Leidner 2018). The design recommendations distilled in Table 4 (e.g., structured participation time, facilitation, visible feedback loops, calibrated thresholds) are transferable principles for sustaining engagement and fostering success in crowdsourcing or participation contexts. Organisations that rely on distributed contributions should pay particular attention to communication measures and feedback transparency, since the absence of visible outcomes is a common source of disengagement across domains (Brugliera 2024; Rechenberger et al. 2015). By framing digital participation as both an innovation mechanism and a learning process, practitioners can align technical, organisational and educational dimensions, thereby enhancing both participation outcomes and the competencies of contributors.

This study is subject to several limitations that shape the interpretation of its findings. The empirical basis draws on interviews with teachers from seven schools and one student survey in a single school context, which limits the generalisability of the results. Moreover, the student sample was confined to younger age groups (10–12 years), meaning that perspectives of older students in the grades seven and above remain unexplored. The findings also rely primarily on self-reported perceptions rather than longitudinal behavioural data, which restricts insights into long-term use and sustained learning effects. Finally, while the conceptual model and design recommendations have been generalised to broader contexts, they should be validated in the wider range of educational organisations, including vocational and higher education (e.g., Busse and Seeber 2024). Furthermore, future research should investigate long-term effects on democratic competencies and explore how evolving platform designs, such as delegated voting or new feedback mechanisms, can strengthen participation and learning.

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