Supporting Educators to Co-Design Interdisciplinary Projects Integrating Educational Robotics and Arts

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Abstract: The growing call to foster interdisciplinary learning has found educators struggling to co-design learning across disciplinary boundaries. Aiming to contribute to the area of interdisciplinary learning design, we explored how to support educators in co-designing interdisciplinary projects integrating Educational Robotics (ER) and Arts, hereafter called Artful ER projects. Our research included developing the "FERTILE" Learning Design methodology as a conceptual tool scaffolding the integration of discipline-oriented viewpoints while educators co-design. Acknowledging that one of the challenges in interdisciplinary collaboration derives from educators' different intentions for students' learning outcomes, the "FERTILE" methodology introduces Computational Thinking (CT) skills as an Artful ER project's primary learning outcome. In this line, the "FERTILE" methodology adapts the Creative Computational problem-solving model, which has been reported to cultivate CT skills through its staged process. Furthermore, we developed the "FERTILE" Community Platform as an online environment providing two-fold support to educators as designers of interdisciplinary learning. The "FERTILE" Community Platform incorporates community functionalities that address collaboration practicalities while educators co-design. Additionally, it integrates authoring functionalities scaffolding educators in designing Artful ER projects based on the "FERTILE" Learning Design methodology. This paper explores how the authoring functionalities of the "FERTILE" Community Platform support educators in designing interdisciplinary learning. We report on a pilot study conducted with Greek and Spanish educators. In this study, we applied a mixed-method research design with a quantitative strand adopting indicators from the Usability Metric for User Experience (UMUX) model and a qualitative strand providing insights into participants' perceptions. The findings indicate that scaffolding disciplinary elaboration (e.g., robot technical requirements and art forms) and systematising interdisciplinary context (e.g., through project categories) may trigger educators' mutual understanding. The participants endorsed authoring functionalities that adopted high contextualisation levels for learning design representation to communicate their design ideas across disciplinary boundaries. Also, the participants valued CT skills as the primary outcome of interdisciplinary learning, indicating that CT skills' cultivation may be the broker among disciplines and trigger educators to overcome disciplinary barriers. Finally, we discuss the findings and implications for refining the "FERTILE" Community Platform as an online environment for educators co-designing Artful ER projects.

Keywords: Interdisciplinary learning design, Community platform, Educational robotics, Arts education, Computational thinking

1. Introduction

There is a growing call to foster interdisciplinary learning by challenging students to construct knowledge based on a synthesis of perspectives derived from multiple disciplines (Stentoft, 2017; Wu, Peng and Hu, 2021). Meanwhile, Learning Design (LD) research highlights the role of educators as learning designers (Asensio-Pérez et al., 2017), advocating a shift from focusing on subject-specific content to devising compelling learning experiences (Mor, Craft and Maina, 2015). In the case of interdisciplinary learning, such a role entails a synergetic combination of discipline-oriented viewpoints to solve a common problem or develop a common artefact. However, educational research suggests that educators struggle to communicate across disciplinary boundaries and achieve interdisciplinary collaboration (Warr and West, 2020; McCance and Blanchard, 2024).

Aiming to contribute to the area of interdisciplinary learning design, we focused on the educators' perspective and the challenges they face while co-designing with educators of other disciplines. To facilitate interdisciplinary learning design, in the context of the "FERTILE: Artful Educational Robotics to promote Computational Thinking in a Blended Learning Context" project, we developed the "FERTILE" Design Methodology, an LD methodology guiding educators to design projects that integrate Arts and Educational Robotics (ER), hereafter called Artful ER

projects. Acknowledging that one of the challenges in interdisciplinary collaboration derives from educators' different intentions for students' learning outcomes, which are anchored in disciplines and subject areas (Stentoft, 2017), the "FERTILE" Design Methodology introduces Computational Thinking (CT) skills (Wing, 2006) as the interdisciplinary learning's primary outcome. It leverages computer programming as a natural habitat for CT skills development (Yeni et al., 2023) and employs the popularity of ER as a motivational and engaging programming practice (Wang, Shen and Chao, 2022; Tzagkaraki, Papadakis and Kalogiannakis, 2021). Also, it exploits the dynamic of Arts as a discipline that has been reported to foster creativity and promote the cultivation of CT skills in recent years (Yeni et al., 2023). Notably, the "FERTILE" Design Methodology acknowledged the marginal role that Art has played in Art-based ER activities (Almpani and Alimisis, 2021) and that ER activities have promoted learning in subjects such as History, Arts and Literature (Tzagkaraki, Papadakis and Kalogiannakis, 2021) suggesting an integrative approach to ER and Arts.

Furthermore, exploiting LD digital tools as authoring tools supporting the design process (Asensio-Pérez et al., 2017; Zalavra and Papanikolaou, 2018) and as community platforms facilitating designers' collaboration (Hernández-Leo et al., 2018; Zalavra and Papanikolaou, 2019), we developed the "FERTILE" Community Platform. The "FERTILE" Community Platform incorporates an authoring tool supporting the design process by synthesising a particular LD representation. Aiming to scaffold educators through the co-design of Artful ER projects based on the "FERTILE" Design Methodology, this LD representation adopts a high degree of guidance and a high contextualisation level as indicated by LD tooling research to support educators as designers (Zalavra et al., 2023). Also, aiming to facilitate collaboration practicalities among educators, it provides a set of community-support features that LD tooling research has suggested as necessary for communities of educators as designers (Hernández-Leo et al., 2018). Educators can use the "FERTILE" Community Platform to design Artful ER projects consisting of subject-oriented activities as well as activities that synthesise both subjects, allowing a high degree of flexibility throughout their collaboration.

This paper presents the research in progress for supporting educators of different disciplines to co-design Artful ER projects through the "FERTILE" Community Platform. Aiming to conduct a preliminary evaluation on how such an online environment may support interdisciplinary learning design, we describe a pilot study addressing the research question: "*How are educators supported in co-designing interdisciplinary projects through the FERTILE Design Methodology and Community Platform?*". In what follows, the background section includes an overview of the "FERTILE" Design Methodology's initial version. The Methods section presents the functionalities under evaluation of an "FERTILE" Community Platform prototype. Also, it describes the pilot study conducted with Greek and Spanish educators. The paper then includes the pilot study's findings. Finally, we discuss the findings and determine their implications for refining the "FERTILE" Community Platform towards supporting interdisciplinary learning design.

2. Background: The "FERTILE" Design Methodology

The "FERTILE" Design Methodology provides a structured approach to designing interdisciplinary projects integrating Arts and ER. Following a design-based research approach, we initiated its development process by collecting perceptions from Spanish, Czech, Slovak, and Greek educators across several educational levels regarding the difficulties they experience and the suggestions they have for designing interdisciplinary projects (FERTILE project, 2022). Their feedback and the corresponding needs analysis allowed us to complement the findings hindering ER adoption related to educators' pedagogical and technological competencies reported in educational research (Papadakis et al., 2021) with issues focusing on interdisciplinary collaboration. It triggered us to determine design principles to be further explored with practitioners during the 3-year-long "FERTILE" project.

Figure 1 depicts the design process suggested by the "FERTILE" Design Methodology to address challenges in co-designing interdisciplinary projects. As seen in the left part of Figure 1, the "FERTILE" Design Methodology promotes a holistic view by integrating the contexts of both Educational Robotics (ER) and the Arts. It shows how these disciplines should synthesise their unique contexts into a cohesive joint project. The project categories are classified based on how Art is combined with ER in the final artefact. These categories are defined as "creating artful robots", "programming robots to create or perform Art", and "programming robots to respond to artful triggers". The middle part of Figure 1, depicts the five steps that the "FERTILE" Design Methodology suggests for developing an Artful ER project. The "FERTILE" Design Methodology adopts this sequencing by adapting the Creative Computational Problem Solving (CCPS) model (Chevalier et al., 2020) in an interdisciplinary context. We chose the CCPS model because it focuses on cultivating CT skills by encouraging creative problem-solving through a cooperative, iterative process involving distinct steps. Lastly, as depicted in

the right section of Figure 1, the "FERTILE" Design Methodology suggests that each step is implemented through a synthesis of learning activities that are either disciplinary-oriented or interdisciplinary, facilitating educators to express the context of both disciplines and guiding students towards developing a common artefact. Most importantly, the "FERTILE" Design Methodology incorporates CT skills as the “broker” between disciplines not only through a) the sequence of steps adapted from the CCPS model but also by b) aiming to cultivate CT skills in each activity within each step, thus providing an integrated approach to developing CT.

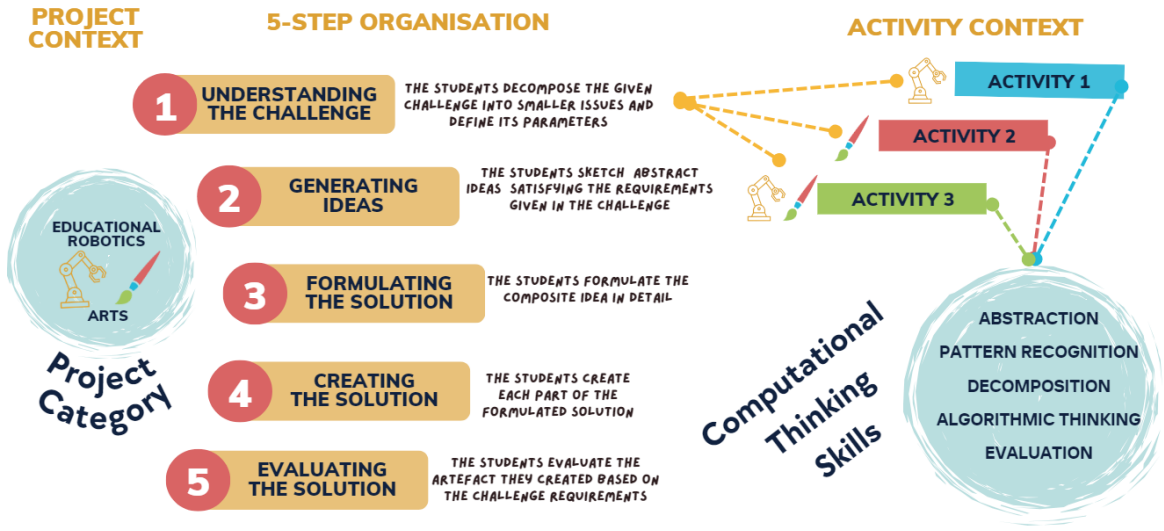

Figure 1: The design process suggested by the "FERTILE" Design Methodology for designing Artful ER projects. Indicatively, the first step includes corresponding learning activities depicting the five steps' design rationale

3. Methods

3.1 Context, Participants, and Procedure

This paper reports a pilot study conducted in two strands with groups of Greek and Spanish educators. The Greek strand, organised by the University of West Attica, emerged from educators participating in an ER course of the master program “Digital Transformation in Education”. The Spanish strand organised by Universidad de Valladolid and Universidad Rey Juan Carlos emerged from educators who responded positively to an open call for participation. The Greek strand spanned over four weeks, utilising three face-to-face meetings, one synchronous online meeting and asynchronous work. The Spanish strand spanned over two weeks, including two face-to-face meetings, one synchronous online meeting and asynchronous work.

Table 1 includes the participants' demographics. Although neither group included participants whose discipline was strictly related to ER and Arts, we asked them to work in pairs so that each member represented the respective disciplines' perspectives while co-designing Artful ER projects. Both strands followed a modular approach, first engaging the participants with the "FERTILE" Design Methodology and then utilising the "FERTILE" Community Platform to co-design Artful ER projects in pairs.

Table 1: The participants’ demographic characteristics (n=21)

Characteristic	Greek Group (n=9)	Spanish Group (n=12)
Sex	1 (11.1%) Male 8 (88.9%) Female	3 (25%) Male 9 (75%) Female
Age (years)	4 (44.4%) 20-30 years old 4 (44.4%) 30-40 years old 1(11.1%) 40-55 years old	8 (66.7%) 20-30 years old 3 (25%) 30-40 years old 1 (8.3%) 55+ years old
Teaching Experience	8 (75%) 0-3 years (novice) 1 (25%) 5+ years (expert)	10 (83.3) 0-3 years (novice) 1 (8.3%) 3-5 years 1 (8.3%) 5+ years (expert)

Characteristic	Greek Group (n=9)	Spanish Group (n=12)
Level of Expertise in LD	7(77,8%) Low 2 (22,2%) Moderate	7(58.3%) Low 3 (25%) Moderate 2 (16.7%) High

3.2 Materials: The "FERTILE" Community Platform

The "FERTILE" Community Platform is an online environment, available as a web application at https://fertile.gsic.uva.es. It comprises an authoring, a community, and a student enactment environment. In this paper, we explore the first one. Co-design teams are scaffolded to author their projects by a representational organisation and format that reflects the "FERTILE" Design Methodology's conceptual, structural, and procedural aspects while facilitating other educators' eventual understanding and reuse.

Figures 2 and 3 depict the representation supported by the "FERTILE" Community platform to facilitate describing a project's context. The authoring window is split into three horizontal sections. The first section, as seen in Figure 2 includes typical fields (project title, description, language, indicative image), enabling designers to describe the general context. Notably, it incorporates the functionality "PROJECT CATEGORY", triggering designers to interweave both disciplines by classifying projects based on how Arts are combined with ER. As seen in Figure 3, the two last sections constitute the "PROJECT DISCIPLINARY CONTEXT" functionality, facilitating designers to elaborate on each discipline's context. The section about Arts includes a field to describe learning objectives set for Arts and another two fields to select the Art forms' categories and subcategories. Likewise, the ER section contains a field describing learning objectives set for ER and five other fields to choose the technology used (robotic kit, programming environment and simulator) and the construction elements (actuators and sensors).

Figure 4 depicts the representation supported by the "FERTILE" Community platform to organise a project, describe an activity's context, and overview a project. The left part of Figure 4 incorporates the "5-STEP-PROJECT ORGANISATION" functionality, aiming to facilitate designers in structuring a project according to the five steps of the "FERTILE" Design Methodology (see Figure 1). The right part illustrates how designers may describe an activity's context. It includes the "ACTIVITY SUBJECT" functionality, enabling designers to define the subject of each activity, whether it is Arts, ER or interdisciplinary. Also, it includes the "ACTIVITY CT SKILLS" functionality, enabling designers to define the CT skills that will be cultivated in each learning activity. Notably, the screenshot depicted in Figure 4 illustrates the guidance provided while determining a particular CT skill. Subsequently, such representation synthesises the "PROJECT OVERVIEW" functionality, describing the interdisciplinarity applied in a project and allowing designers to reflect on how both disciplines are interwoven (note the colouring used for labelling activities: blue for Arts, red for ER, and green for both disciplines).

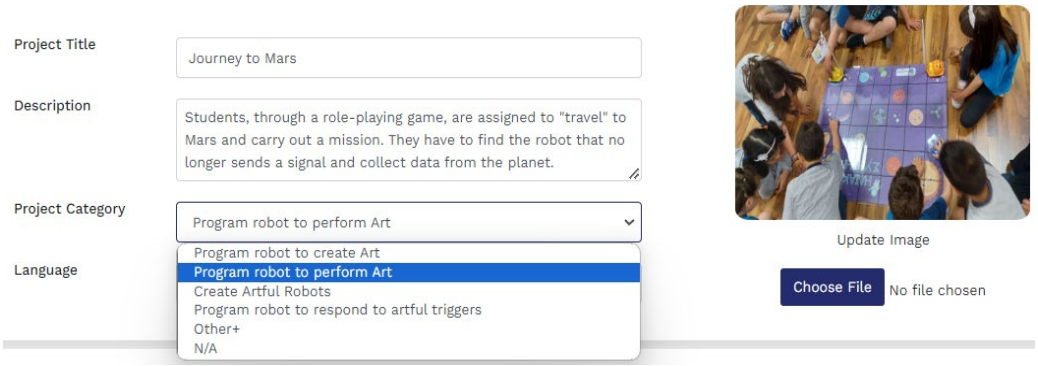

Figure 2: A screenshot of the "FERTILE" Community Platform depicting an Artful ER project's general context description

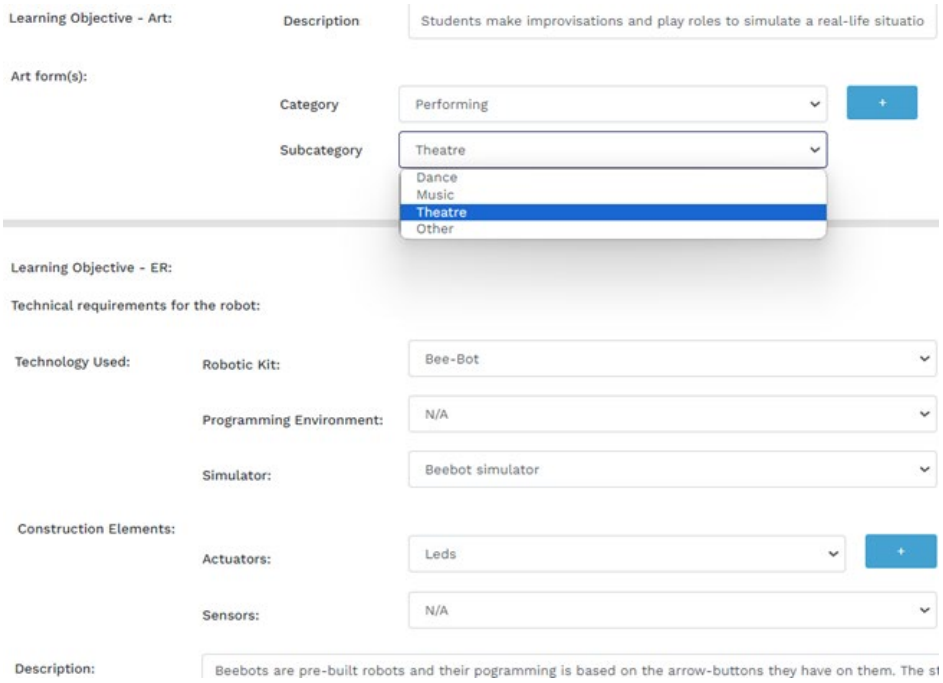

Figure 3: A screenshot of the "FERTILE" Community Platform depicting an Artful ER project's disciplinary context description

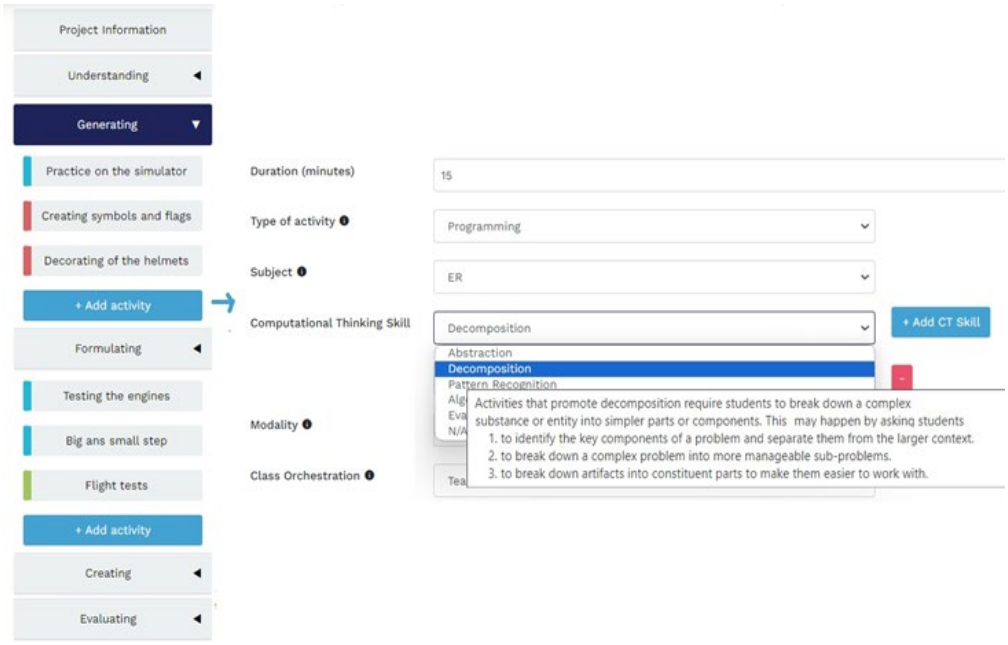

Figure 4: A screenshot of the "FERTILE" Community Platform depicting the representation supported in organising a project, describing an activity's context, and providing an overview of a project

3.3 Research Design, Data Collection and Analysis

To address the research question, "How are educators supported in co-designing interdisciplinary projects through the FERTILE Design Methodology and Community Platform?" we followed a mixed-method research design (Creswell and Plano Clark, 2017), exploring how the participants experienced co-designing projects that integrate ER and Arts in the "FERTILE" Community Platform. We utilised a survey questionnaire to collect participants' perceptions through close-ended questions about the "FERTILE" Community Platform's authoring functionalities reflecting the "FERTILE" Design Methodology's design principles. Also, we triggered participants to comment on their responses to the close-ended questions and provide suggestions through open-ended questions.

To formulate the quantitative feedback, we adopted the Usability Metric for User Experience (UMUX), a model considering usability in terms of ISO 9241-11 and applying four indicators about (1) effectiveness, (2) satisfaction, (3) ease of use and (4) efficiency (Finstad, 2010). In this line, we expressed each close-ended question addressing an authoring functionality as four statements corresponding to the four indicators included in UMUX:

1. "This <functionality> meets my requirements" to indicate perceived effectiveness,
2. "Using this <functionality> is a frustrating experience" to indicate perceived satisfaction,
3. "This <functionality> is easy to use" to indicate perceived ease of use, and
4. "I have to spend too much time designing with this <functionality>" to indicate perceived efficiency.

Each statement is scored on a Likert scale, from 1 (strongly disagree) to 7 (strongly agree). Notably, as the UMUX model requires, the statements were unidimensional. The 1st and 3rd statements were positive-toned, while the 2nd and 4th statements were negative-toned ones. Consequently, the high responses to the positive-toned statements correspond to high usability, while the high responses to negative-toned statements correspond to low usability.

The UMUX provided an excellent alternative to the typical System Usability Scale (SUS) while having a similar high reliability without requiring a minimum number of participants to achieve accurate results (Borsci et al., 2015). Like SUS, we calculated the overall UMUX score per participant for each functionality and then calculated the overall usability (Finstand, 2010) of the "FERTILE" Community Platform's authoring functionalities. Thus, in the findings section, Table 2 presents the average scores and standard deviations of the UMUX score for each functionality and the overall UMUX score.

Furthermore, as suggested by Albo and Hernandez-Leo (2021), the UMUX provided a compact and efficient usability instrument that allowed us to explore the perceived value of each authoring functionality across specific usability indicators. Therefore, we calculated the distribution of participants' responses to the four UMUX statements, presenting this distribution in Table 3. Specifically, Table 3 details the frequency of responses for each UMUX indicator across the authoring functionalities supporting educators in co-designing interdisciplinary projects using the "FERTILE" Community Platform. This detailed breakdown enabled us to assess the usability of authoring Artful ER projects in the "FERTILE" Community platform comprehensively, offering trends of its perceived value as experienced by the participants.

Finally, in the open-ended questions, after translating Greek and Spanish into English, we analysed the participants' responses following a deductive coding process per functionality based on the four indicators addressed in UMUX. Such analysis complemented the quantitative findings, providing insights into the perceived value of each authoring functionality and the participants' suggestions.

4. Findings

First, we determined Cronbach's alpha to be 0.86, which indicates strong internal consistency in measuring educators' feedback (Hulin, Netemeyer and Cudeck, 2001).

Table 2 presents the UMUX scores for each "FERTILE" Community Platform's authoring functionality and overall usability. The average overall score was 86.93 with a standard deviation of 12.49, indicating generally positive usability of the platform's authoring functionalities supporting interdisciplinary co-design. Notably, all functionalities scored close to the overall score, showing high usability across the platform's functionalities. The functionality "Project Overview" stood out with the highest average score of 88.83. However, the higher standard deviations in some functionalities, such as the "Activity CT Skills" (16.18) and "Activity Subject" (15.21), indicate variability in participants' perceptions.

Table 2: The UMUX score for each "FERTILE" Community Platform's authoring functionality and the overall usability

Authoring functionality	PROJECT CATEGORY	PROJECT DISCIPLINARY CONTEXT	5-STEP-PROJECT ORGANISATION	ACTIVITY SUBJECT	ACTIVITY CT SKILLS	PROJECT OVERVIEW	Overall Usability
Average Participants Score	85.98	86.55	86.55	87.50	86.17	88.83	86.93
Standard Deviation	12.63	13.17	13.30	15.21	16.18	14.23	12.49

The distribution of participants' responses in the UMUX indicators per functionality, as presented in Table 3, allowed us to further elaborate on participants' perceptions. The consistently positive trends in all indicators support the high average scores of all functionalities. The "Project Overview" functionality, having the highest average score (88.83), is reflected in distributions in Table 3, showcasing that 63.6% of participants strongly agreed on its effectiveness and the same percentage (63.6%) on its ease of use. On the other hand, functionalities reporting higher variability in Table 2 correspond to more mixed responses in Table 3. For example, 59.1% of participants strongly agreed on the effectiveness of the functionality "Activity CT skills", but a notable percentage (22.7%) questioned its efficiency.

Table 3 shows that most participants expressed positive views on the effectiveness of all functionalities, with approval ratings (5 up to 7 on the Likert scale) ranging from 86.4% to 95.5%. Regarding satisfaction, the participants unanimously found the "FERTILE" Community Platform functionalities to have met their expectations since 100% (1 up to 3 on the Likert scale) disagreed that using them was a frustrating experience. Regarding "Ease of Use" impressions, most respondents indicated that all the "FERTILE" Community Platform's functionalities were easy to use, with approval ratings (5 up to 7 on the Likert scale) ranging from 86.4% to 95.5%. Additionally, more than 80% of respondents perceived the "FERTILE" Community Platform's functionalities as efficient, as indicated by the disagreement ratings (1 up to 3 on the Likert scale) ranging from 81.8% to 90.9% for having to spend too much time using these features.

Table 3: Distribution (frequencies) of participants' responses to UMUX statements

Authoring Functionality	UMUX indicators	Strongly Disagree				Strongly Agree		
		1	2	3	4	5	6	7
PROJECT CATEGORY	Effectiveness	0.0	4.5	4.5	0.0	22.7	18.2	50.0
	Satisfaction	63.6	31.8	4.5	0.0	0.0	0.0	0.0
	Ease of Use	0.0	4.5	0.0	0.0	13.6	27.3	54.5
	Efficiency	36.4	36.4	18.2	0.0	4.5	4.5	0.0
PROJECT DISCIPLINARY CONTEXT	Effectiveness	0.0	4.5	4.5	4.5	4.5	36.4	45.5
	Satisfaction	59.1	36.4	4.5	0.0	0.0	0.0	0.0
	Ease of Use	0.0	4.5	0.0	4.5	13.6	31.8	45.5
	Efficiency	50.0	36.4	4.5	4.5	0.0	4.5	0.0
"5-STEP-PROJECT ORGANISATION"	Effectiveness	0.0	4.5	0.0	0.0	13.6	22.7	59.1
	Satisfaction	59.1	36.4	4.5	0.0	0.0	0.0	0.0
	Ease of Use	0.0	0.0	4.5	0.0	18.2	27.3	50.0
	Efficiency	40.9	31.8	9.1	9.1	4.5	0.0	4.5
"ACTIVITY SUBJECT"	Effectiveness	0.0	4.5	4.5	0.0	4.5	22.7	63.6
	Satisfaction	72.7	22.7	4.5	0.0	0.0	0.0	0.0
	Ease of Use	0.0	4.5	0.0	9.1	0.0	36.4	50.0
	Efficiency	54.5	22.7	9.1	0.0	4.5	4.5	4.5
"ACTIVITY CT SKILLS"	Effectiveness	0.0	4.5	4.5	4.5	0.0	27.3	59.1
	Satisfaction	68.2	22.7	9.1	0.0	0.0	0.0	0.0
	Ease of Use	0.0	4.5	4.5	0.0	22.7	27.3	40.9
	Efficiency	54.5	22.7	9.1	4.5	4.5	4.5	0.0
"PROJECT OVERVIEW"	Effectiveness	0.0	4.5	0.0	4.5	0.0	27.3	63.6
	Satisfaction	68.2	27.3	4.5	0.0	0.0	0.0	0.0
	Ease of Use	0.0	4.5	0.0	4.5	0.0	27.3	63.6
	Efficiency	50.0	27.3	4.5	13.6	0.0	0.0	4.5

The content analysis of the open-ended questions provided insights into participants' perceptions (labelled ESx or GRx as participants of the Spanish or Greek groups, respectively). Regarding the "project category" functionality, the participants asked for "more project categories" (ES5).

Aligning with the highly perceived effectiveness of "the project disciplinary context" functionality, the participants deemed that "it provides a design that is well-oriented" (ES5) and that "All art forms and robotics technologies are included" (GR1). Furthermore, the participants reported that this functionality was "intuitive" (ES10) and "simple" (GR3), thus clarifying its high ease of use ratings. Lastly, the high-efficiency ratings of the "project disciplinary context" functionality are interpreted by quotes such as "allows making projects that cover several areas" (ES8).

Regarding the "5-step project organisation" functionality, the participants found "the proposed steps to be adequate" (ES5) and "appropriate for collecting project characteristics" (ES8), reflecting its high usability score. However, some participants expressed being "perplexed while distinguishing the steps a project should follow" (ES4), indicating their need for guidance.

The participants appreciated the "guidance to describe an activity" (ES8), explaining the high satisfaction and effectiveness ratings of the "Activity Subject" functionality. Although the participants appreciated "selecting the CT skills" (GR1), they commented that "skills separation is not distinct" (GR7), which explains the variability in the effectiveness and efficiency scores for the "Activity CT skills" functionality.

The participants reported that "it is rewarding to see the design take shape" (ES4) through the "Project Overview" functionality" and that it provided "a distinguishable format" (GR8), which provides insights into the high satisfaction and effectiveness ratings.

5. Discussion and Conclusions

To address how educators of different disciplines are supported in co-designing interdisciplinary learning through the authoring environment of the X Community Platform, we conducted a pilot study with 22 Greek and Spanish educators. Following a mixed research design, we explored their perceptions regarding functionalities supporting them to co-design Artful ER projects. The quantitative and qualitative strands adopted four indicators of the UMUX usability scale: effectiveness, satisfaction, ease of use, and efficiency.

The findings indicate high usability for the "FERTILE" Community platform's authoring functionalities, with consistently positive educators' perceptions. The findings' strong internal consistency, coupled with the overall high usability score, demonstrate that the platform's functionalities support interdisciplinary co-design.

The participants responded favourably to two functionalities, allowing them to describe an Artful ER project's context by providing each discipline's context and interweaving both disciplines through a project category. The high level of perceived effectiveness indicates that scaffolding disciplinary elaboration (e.g., Art forms and robot technical requirements in the case of Arts and ER disciplines) and systematising interdisciplinary context (e.g., through project categories) may trigger educators' mutual understanding. Participants proposing to consider more project categories highlight that such practices may promote a synergetic combination of discipline-oriented viewpoints and tackle the disciplinary boundaries reported in educational research (see Warr and West, 2020; McCance and Blanchard, 2024).

Furthermore, the high perceived efficiency and insights about supporting diverse interdisciplinary projects are noteworthy. The participants endorsed two functionalities integrated into an activity's context description, triggering educators to specify the activity's disciplinary or interdisciplinary subject and the CT skills to be cultivated through predefined lists. The endorsement of their effectiveness suggests that the high contextualisation level and degree of guidance are adequate practices for communicating design ideas across disciplinary boundaries. Notably, the participants' request for further guidance on defining CT skills showcases their interest in further exploring the "FERTILE" Design Methodology's introduction of CT skills as interdisciplinary learning's primary outcome, reconsidering the typical discipline and subject-oriented learning outcomes (Stentoft, 2017).

The participants' feedback indicated the value of the "FERTILE" Design Methodology's 5-step sequencing as an adequate method to organise interdisciplinary learning. The perceived value was twofold. On the one hand, the participants praised its effectiveness in structuring an Artful ER project through the representational organisation applied in the "FERTILE" Community Platform. However, they required guidance in distinguishing the steps a project should follow to be fully satisfied. On the other hand, the representational format applied in the "FERTILE" Community Platform was praised for its effectiveness in providing a distinguishable project format.

The participants were also satisfied with this comprehensible overview, which allowed them to reflect on how both disciplines are interwoven.

Although the limitations of this research refer to the small sample of participants, it provides us with a preliminary evaluation of the "FERTILE" Community Platform prototype and its design rationale based on the "FERTILE" Design Methodology. There is conspicuous evidence that the "FERTILE" Community Platform supports educators' collaboration in designing interdisciplinary learning through the design principles of the "FERTILE" Design Methodology and their representation in the "FERTILE" Community Platform. The insights collected through this pilot study allow us to further elaborate on refining the "FERTILE" Community Platform. To this end, we intend to reinforce interdisciplinary co-design by facilitating educators to interweave disciplines as project categories and further the "FERTILE" Community platform with a functionality providing guidance on adopting CT skills as the primary outcome of interdisciplinary learning.

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