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Enhancing Environmental Awareness through Media Storytelling in Built Environment Education

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Abstract

This study presents a pedagogical case from a fourth-year course, Theory of Built Environment Interaction, in which students developed community awareness campaigns addressing water issues, climate change, and environmental justice. Using video storytelling and child-friendly animation, students translated theoretical concepts into accessible narratives for both adults and children. The project combined environmental education, community engagement, and digital media production, including the application of AI-based tools. The evaluation included post-screening surveys with community members and reflective surveys with students. Results indicate increased environmental awareness among participants, particularly children, and demonstrate the effectiveness of storytelling as a medium for environmental communication. Student reflections highlight enhanced learning outcomes in systems thinking, collaboration, ethical responsibility, and public engagement. The findings suggest that universities can serve as mediators between environmental knowledge and society, positioning design education as a catalyst for awareness, agency, and sustainable action beyond the classroom.

Keywords: Environmental Awareness; Pedagogy; community Engagement; SDGs; Civic University.

1. Introduction

Environmental issues such as climate change, water waste, resource consumption, and justice are considered global challenges that have worsened worldwide and exacerbated environmental degradation, accompanied by socio-spatial inequalities between countries in the Global South and North, and even within a single city (Ngcamu, 2023). This crisis highlighted the need for a new, innovative approach in higher education, and specifically in the architectural, urban, and environmental curriculum (Kinol et al., 2023). Nowadays, universities are increasingly expected to act not only as generators of knowledge and providers of scientific foundations, but also as facilitators between government and community, and as simplifiers of knowledge for the general public, particularly for vulnerable communities with limited access to education. Thus, the concept of civic universities became a necessity, as they should serve as catalysts for social change by training graduates to respond to complex socio-spatial and socio-environmental challenges and to mediate between expert knowledge and public understanding (Hassan & Lee; Rojak, 2021; Thomas, 1998).

Several scholars in environmental pedagogy have highlighted the significance of storytelling and the use of digital media in increasing environmental awareness among diverse age groups (Good & Smith, 2024; Nemakhavhani, 2024; Smith et al., 2023). According to Mousavi et al. (2024), found that digital storytelling could help young children understand complex sustainability concepts. Also, action-based storytelling that showcases concrete, feasible positive environmental behaviours can increase viewers' sense of self-efficacy. A recent comparative study examining the effectiveness of visual storytelling strategies in digital climate campaigns found that interactive infographics can enhance data-driven communication, improving comprehension and emotional engagement. Thus, media storytelling can fill the gap between scientific environmental knowledge and everyday experience. This, in turn, could support both cognitive and affective dimensions of environmental learning (Gyeol et al., 2025).

1.1 Problem Statement and Research Gap

Despite the presence of the aforementioned studies, empirical work that combines different fields such as the built environment, environmental storytelling, higher education philosophies, and community engagement remains unclear or insufficient. Studies of sustainability and environmental control in architecture curricula have focused primarily on the outputs of design quality and building performance. This, in turn, does not prioritize students' engagement and their effective role as community communicators (El-Halwagy, 2024). Equally, research on environmental storytelling and AI-assisted narratives has focused on involving teachers or researchers as content designers, rather than storytellers (Mousavi

et al., 2024). Additionally, few documented cases examine how built-environment students might use AI-supported media to create child-friendly environmental stories for local communities. Also, the answer to how such projects might support community awareness and student learning is still unclear (Smith et al., 2023).

This study addresses this gap by presenting a case study from a fourth-year course, Theory of Urban–Environment Interaction (ARC 411), at E-JUST in Alexandria, Egypt, through students' semester project titled 'Sustainable Storytellers: Bridging Urban Design and Community Action.' Student groups translated theoretical content—on urban water systems, green spaces and climate resilience, and environmental justice—into media-based awareness campaigns for the local community. Their brief explicitly aligned their work with selected Sustainable Development Goals (SDGs) and identified distinct target audiences: adults and children. Students' deliverables included video scripts, graphic elements, posters, and community deployment strategies. For this study, the researcher (the course instructor) focuses on six media artefacts produced through this project: three documentary–action videos for adults, three animated stories for children, scripts and stories created by students, and AI tools for visualization.

1.2. Research Aim and Objectives

This study addresses the previously identified gap by evaluating the impact of a media-based storytelling project embedded within an environmental theory course. The research examines how such an initiative can enhance environmental awareness among students and local communities and considers its implications for built-environment curricula. The study pursues three primary objectives; The first objective is to investigate student learning and identity development within the "Sustainable Storytellers" project. This includes examining how architecture students understand urban–environment interactions, perceive design as a tool for environmental communication, and navigate the use of AI-assisted media. This objective is directly informed by constructivist and reflective-practice theories in higher education (Osterman, 1998; Schon, 1983). The second objective is to examine the perceptions of adult and child audiences regarding the student-produced videos. This includes assessing message clarity, perceived relevance to daily life in Egypt, and self-reported changes in awareness and responsibility related to water use, climate change, and environmental justice. This objective situates classroom practice within broader debates on environmental storytelling and climate communication, particularly concerning narratives that resonate with diverse publics (digital climate campaigns and children-as-climate-storytellers initiatives). The third objective is to derive design principles for integrating media storytelling and community engagement into built-environment curricula. By triangulating student performance data, survey responses, and qualitative reflections, the study aims to articulate practical guidelines on task design, scaffolding, and partnerships to support the adoption of similar approaches in environmental and urban courses (El-Halwagy, 2024). Accordingly, the study is guided by the following research questions:

- RQ1 – Student learning: How do ARC 411 students experience the "Sustainable Storytellers" project with respect to their understanding of urban–environment interaction, their skills in scripting and visual communication, and their development as environmental storytellers?
- RQ2 – Public impact: How do adult and child viewers assess the clarity, relevance, and motivational impact of the student-produced videos addressing water, climate change, and environmental justice?
- RQ3 – Pedagogical implications: What design principles for built-environment and architectural curricula can be derived from these experiences and evaluations concerning the integration of environmental theory, media storytelling, AI tools, and community engagement?

Collectively, these objectives and research questions position the paper to make empirically and theoretically meaningful contributions to ongoing discussions on constructivist pedagogy, environmental storytelling, and sustainability-oriented reform in built-environment education.

2. Materials and Methods

This section describes the implementation of the "Sustainable Storytellers" project in ARC 411: The Theory of Urban–Environment Interaction, as well as the research design (see figure 1) and the procedures for data collection and analysis used to address the research questions. The course investigates the interactions among urban form, infrastructure, human behaviour, and environmental systems, structured around three thematic clusters: (1) urban water and waste cycles, (2) green spaces, air quality, and climate resilience, and (3) consumption, justice, and environmental equity. In fall 2026, the semester project was redesigned as "Sustainable Storytellers: Bridging Urban Design and Community Action," a constructivist, project-based assignment requiring students to translate theoretical content into media campaign using both traditional and AI-assisted tools. This project contributed to the continuous assessment, alongside homework, and the final examination.

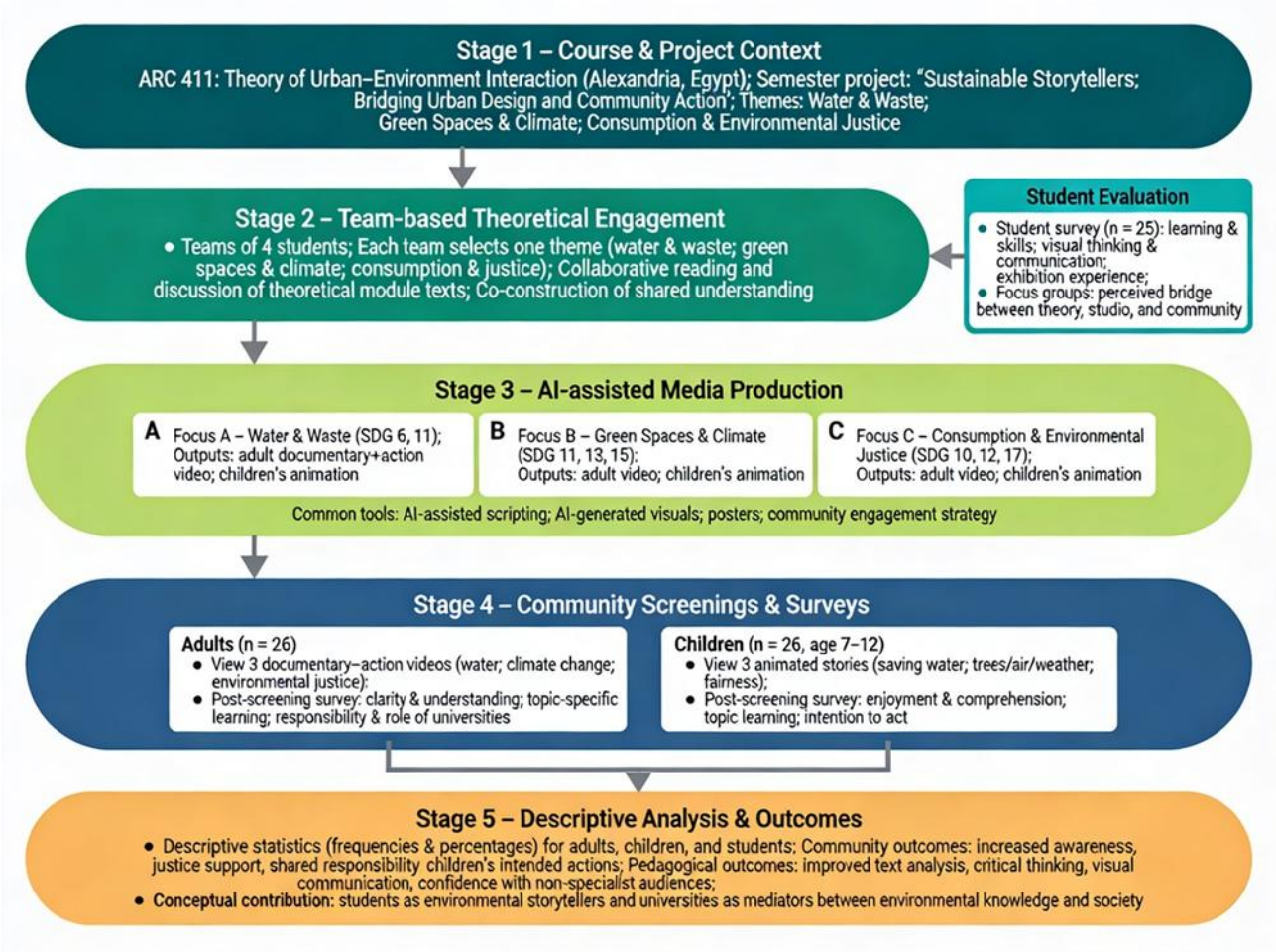


Figure 1. presents study design and stages (author).

Students collaborated in teams of four to five. Each team picked one of three focus areas, each aligned with specific Sustainable Development Goals (SDGs) and tailored to community audiences: water issues (SDG 6 and 11); green spaces and climate (SDG 11, 13, and 15); or consumption and environmental justice (SDG 10, 12, and 17). Building on their chosen theme, teams then created a communication package that included: (a) an adult-oriented documentary video on the problem, its local causes, and practical actions (see figure 1); (b) a child-oriented animated or cartoon video addressing the same theme in accessible language (see figure 2); (c) visual materials such as posters and key graphics; and (d) a brief community engagement strategy, outlining potential future development and incorporating survey questions developed collaboratively by the instructor and students during a workshop. Throughout the process, students were encouraged to use AI tools for image generation, storyboarding, or voice-over, provided all outputs were critically reviewed and edited.

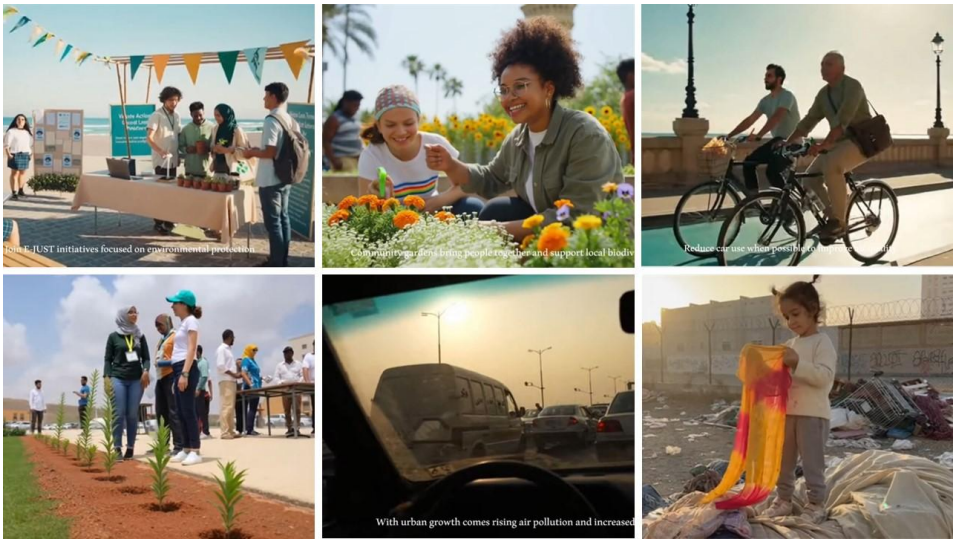


Figure 2. presents scenes from the three adult videos done by the students and course instructor (author).

Figure 3. presents scenes from the three children videos done by the students and course instructor (author).

The project lasted about 10 weeks of a 14-week semester. In Weeks 4–5, teams chose topics and reviewed assigned readings. Weeks 6–8 focused on scripting and storyboarding, guided by tutorials on narrative, audience, and visuals. From Weeks 9–11, students produced rough cuts or animatics using drawing, graphic design, basic animation tools, and AI, and got feedback on clarity, ethics, and course alignment. In Week 12, the final videos were distributed for the public and adults and children viewed them and completed brief evaluation forms (surveys). Week 13 was set aside for debriefing, during which students discussed audience responses and completed an online post-project survey.

A mixed-methods case study design was employed, incorporating both quantitative and qualitative data from three groups: ARC 411 students, adult viewers, and child viewers. Data sources comprised (1) course-grade records for all students (n = 13); (2) an online student survey (thirteen responses) featuring Likert-scale items and four open-ended questions; (3) an adult viewer survey (n = 26) capturing socio-demographic information and perceptions of video clarity and impact; (4) a children's survey (n = 26) with simplified items addressing enjoyment, comprehension, and learning; and (5) open-ended qualitative responses from students regarding key learning outcomes, beneficial project components, challenges, and suggestions for improvement. The design was descriptive and exploratory, seeking to provide an in-depth understanding of processes and perceptions while highlighting pedagogical principles. Adult participants included parents, university staff, students from other programmes, and local residents with diverse educational backgrounds. Child participants were aged 7 to 12 years, with parental consent obtained; these children completed the questionnaire with assistance as required. Given the small sample sizes, the findings are interpreted as indicative of a pilot study rather than representative of the broader population.

Descriptive statistics were calculated for each quantitative survey item. Qualitative responses to the four student open-ended questions were analysed thematically using an inductive–deductive approach. This process involved open and axial coding to identify themes, including design as social impact, the role of scripting and visuals, the dual nature of AI as both beneficial and challenging, challenges in communicating with non-experts, and proposals for deeper engagement. Representative quotations were selected to illustrate each theme in the results and discussion sections. Quantitative and qualitative findings were triangulated where possible. For instance, high levels of agreement regarding the project's impact on understanding were corroborated by comments emphasizing the influence of urban design on various aspects of life and the importance of prioritizing content over superficial appearance. The project was integrated into routine teaching and complied with the university's course approval and ethics procedures. Participation in surveys was voluntary and anonymous, with no effect on student grades. Informed consent was obtained from all adult participants and from the parents of child participants.

3. Results

This section presents the empirical results of the "Sustainable Storytellers" project in ARC 411, utilizing multiple data sources to capture both student and audience perspectives. The analysis first examines student learning outcomes through course grades, post-project survey responses, and open-ended reflections to demonstrate the activity's influence on understanding of urban–environment theory, design attitudes, and learning processes. Subsequently, the evaluation by adult and child viewers regarding the clarity, relevance, and motivational impact of the student-produced videos is reported. Finally, these findings are integrated to illustrate how the project supported both student learning and community environmental awareness.

3.1 Student learning outcomes

This subsection integrates grade data, student survey responses, and open-ended reflections. Together, these sources characterize how ARC 411 students experienced the "Sustainable Storytellers" project.

3.1.1 Academic performance in ARC 411

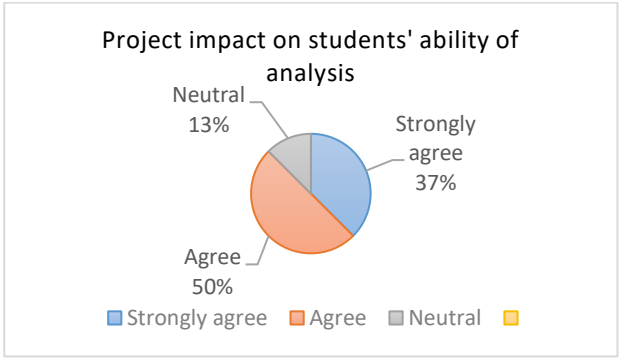
The thirteen students enrolled in the course demonstrated strong overall performance. Most students achieved scores within the 80–100% range, and no student scored below 60%. These results indicate that the cohort maintained

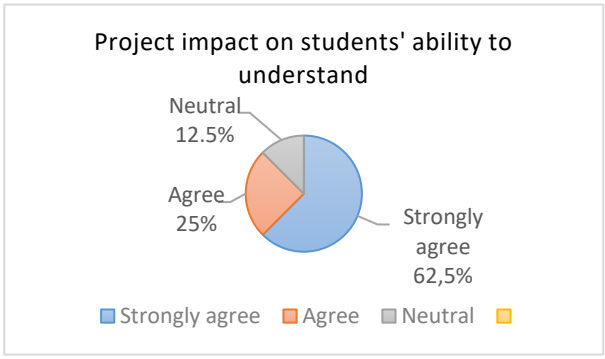
satisfactory conceptual and technical competence to benefit from the project-based learning experience. Furthermore, the storytelling project did not negatively affect overall course performance; instead, it appeared to facilitate students' study and recall of theoretical material.

3.1.2 Perceived impact on theoretical understanding and analytical skills

The post-project student survey (n = 13) provides evidence of how learners perceived the project's impact on their conceptual understanding and analytical abilities. Survey results were highly positive in rating these two questions (see figure 5):

- Reading and discussing the texts in my team improved my ability to analyze academic arguments about urban–environment interaction.
- This project helped me understand the theoretical concepts covered in the ARC 411 module more deeply.





Figures 4. charts present impact of project on students' ability of understating and analysis (n=13) developed by the author.

Thus, 87.5% of respondents perceived that the project positively affected their theoretical understanding, indicating a notable impact of the "Sustainable Storytellers" activity on how students absorbed course concepts. These findings indicate that students attributed significant learning gains to collaborative engagement with reading and to the requirement to transform theory into communicable forms. This pattern is consistent with constructivist findings that social interaction and authentic tasks enhance deep learning and critical thinking in higher education.

3.1.3 Reframing urban design and environmental awareness

Open-ended answers reveal how students interpreted these learning gains, demonstrating a shift from abstract knowledge to recognizing the direct connection between urban and environmental issues in daily life. This is illustrated in the following student reflection:

"Environmental issues affect all aspects of people's lives… it affects them directly."

Another emphasizes that:

"People's awareness is key to improving their environment; most people are not aware of the problems around them, and these problems shape people's minds and control what they deserve and what they don't deserve."

These statements indicate that students moved beyond understanding environmental concepts to seeing urban and environmental design as a powerful social force, with awareness linked to environmental justice. This resonates with literature arguing that integrating environmental content into design courses fosters responsibility and underscores the social outcomes of environmental decisions (Amrhein & Balaban, 2024; El-Halwagy, 2024).

Another respondent explicitly links the project to global sustainability frameworks:

"It developed my skills as a designer in addition to knowing more about my topic, environmental challenges and SDGs."

Here, the student indicates that the project helped situate course content within the Sustainable Development Goals, illustrating how new knowledge is anchored in broader conceptual networks, which aligns with constructivist notions of 'meaningful learning.'

3.1.4 From surface aesthetics to content-driven, socially engaged design

Several students highlighted the significance of focusing on the quality of design and the main concept more than the aesthetics of visual advertisement (poster) and video, as one student noted:

"I've learned that we should focus more on the content of the project, not just on visuals."

Others mentioned that the most important lesson learned during this semester was:

"How design can be used as a tool for awareness and social impact, not only as a visual output."

A third student concluded:

"It reflected how creativity is not limited but open to all tools. It depends on the idea itself."

Together, these comments indicate that the project supported a move from design understood primarily as formal or aesthetic production to design understood as communicative, critical, and ethically oriented. This progression aligns with historical and contemporary readings of Bauhaus and post-Bauhaus design education, which emphasize experimentation and social responsibility over formalism alone (Oktan & Vural, 2019). It also exemplifies Schon's (1983) account of the designer as a reflective practitioner who explores problems through representations to act in socially responsible ways, thus connecting student perception with established theories.

3.1.5 Emerging identities as storytellers and communicators

Several students describe discovering themselves as storytellers, scriptwriters, and communicators, and the project taught them to convey global ideas and challenges through campaigns. One extended reflection stated:

"The most important thing I learned from this project was how design can be used as a tool for awareness and social impact, not only as a visual output. I also discovered more about myself as a learner and designer; I realized that I enjoy visual storytelling, scripting, and video creation much more than traditional text-based work. The project helped me develop skills in writing, editing, and communicating ideas creatively, and made me more confident in these skills."

These narratives suggest that students were not simply learning about environmental issues; they were also learning to see themselves as agents who can shape public discourse. Such identity shifts mirror outcomes reported in environmental storytelling and youth climate-media projects, where participants gain a heightened sense of agency when they produce their own climate narratives (digital climate campaigns and children-as-climate-storytellers initiatives).

3.1.6 Learning processes: scripting, visuals, AI tools, and teamwork

When asked which parts of the project helped them learn the most, students consistently highlight scripting, visualization, AI tools, and team discussions. Most of them emphasized that creating the animated videos helped the most, as it required turning research into visuals and scripts. Team discussions and feedback were also very useful. Example responses include:

"Scripting was a key factor for building our ideas and presenting them."

"The part that helped me learn the most was working on the visual content itself, especially scripting, video production, and experimenting with AI tools. Team discussions and collaborative work were also a big part of the learning process, because exchanging ideas improved both the concepts and the final outputs."

These narratives suggest that learning was driven by continuous translation. It started with academic texts, then scripts, and finally visual scenes, and moved from drafts to final videos. According to Alam (2023), all these exercises were negotiated within teams. This relates to studio-based pedagogies, in which knowledge is constructed through cycles of representation, critique, and revision. It also echoes with constructivist research. As students gain deep learning through transforming information by summarizing and representing it, this in turn transforms the educational experience from teacher-centered to student-centered pedagogy.

Within these learning processes, AI tools emerged as ambivalent but important resources. One student remarked that:

"AI tools, scripting (helped me simplify ideas, terms, concepts) and team discussions helped the most."

Here, AI is framed as a cognitive frame that assists in simplification and visualization, while still requiring human judgment and collaboration.

3.1.7 Challenges and critical digital literacy

The processes that facilitated learning simultaneously introduced significant challenges, particularly regarding the reliability of artificial intelligence, time limitations, and communication with individuals lacking technical expertise. Students note that:

"AI tools were not the best option as they get stuck sometimes. Except for cartoonish videos, they were great."

"Time management, and the accuracy of the AI tools – it takes time."

Another student elaborates:

"One of the main challenges was working with AI tools. While they often gave useful and promising results, they still needed a lot of refinement, especially in voice-over generation, which sometimes sounded unclear or inconsistent."

In addition to technical challenges, several students emphasize the difficulty of conveying complex concepts to audiences without specialized knowledge:

"Deciding how to visually represent abstract water issues like overuse and waste in a way that is easy to understand, and balancing engagement with accurate information."

These challenges suggest that students engaged with the complexities inherent in digital production and science communication, rather than simply completing predetermined tasks. From a pedagogical perspective, such difficulties serve as evidence of critical digital literacy and reflection-in-action: students were required to evaluate AI-generated outputs, make ethical and aesthetic decisions regarding representation, and navigate trade-offs between simplification and accuracy (Schon, 1983).

3.1.8 Student-generated proposals for improving the project

- Students' suggestions for future iterations demonstrate a metacognitive awareness of effective learning support. These proposals include:
- Greater authorship and depth: "students should make actual videos of their creation, 100% human-made"; "we should go deeply into ideas, not just talking about the main subject."
- Stronger real-world engagement: more public activities or site visits, collaborations with schools or organizations, and public workshops showcasing course outcomes.
- Enhanced scaffolding and feedback: more guidance and workshops on AI tools, storytelling, and animation; more time for revisions; and structured feedback after sharing videos.
- Iterative cycles: "introducing multiple iteration stages, where scripts are tested, evaluated, and refined," and "spreading awareness through a series of videos and applicable tips."
- These suggestions closely align with best practices in constructivist and project-based curriculum design, including scaffolded skill development, authentic partnerships, and iterative refinement (El-Halwagy, 2024; Salama, 2012;

Schon, 1983). They will be revisited in the Discussion and Conclusion as specific recommendations for future course development.

3.2 Responses from Adult and Child Audiences

This subsection reports findings from adult and child viewers of the "Sustainable Storytellers" videos, as well as responses to questionnaires distributed and administered by students.

3.1 Adult Respondents

Adult viewers demonstrated high levels of comprehension and perceived relevance. For the statement, "The videos were clear and easy to understand," 53.8% of the 26 respondents selected "Strongly agree" and 46.2% selected "Agree," with no neutral or negative responses. A similar distribution was observed for the statement, "The videos helped explain how environmental issues affect daily life in Egypt," with 57.7% strongly agreeing and 42.3% agreeing. These results indicate that the student-produced media effectively conveyed complex topics using accessible language and visuals.

Regarding the statement, "Watching the videos increased my awareness of environmental problems," 73.1% answered "Yes" and 26.9% "No," suggesting that nearly three-quarters perceived an increase in awareness after viewing the videos. Topic-specific questions reinforced this trend: for the water-related video, 73.1% felt it clearly explained the problem and its causes, and 69.2% reported feeling more responsible about water use. For the climate change video, 73.1% indicated a better understanding of its impact on Egypt, and 88.5% agreed or strongly agreed that climate change requires urgent action, with no disagreement. For the environmental justice video, 73.1% stated it helped them understand how environmental problems affect people differently, while 96.1% agreed or strongly agreed that environmental justice should be considered in development and planning decisions.

Respondents also expressed opinions on responsibility and the university's role: 73.1% believed that government and citizens together should be responsible for addressing environmental problems in Egypt, and an equal proportion thought universities should contribute to raising environmental awareness. In summary, the adult data indicate that the media were clear and credible and supported the perspective that environmental solutions require shared civic responsibility.

3.2 Children Respondents

Children's responses were uniformly positive. This outcome underscores the effectiveness of the child-oriented materials. All 26 participants reported that they "enjoyed watching the videos," found the "stories were easy to understand," and believed the cartoons helped their learning. This indicates high affective engagement and clarity.

Regarding specific learning outcomes, every child affirmed that "The video taught me how to save water." They also agreed that "The video taught me why trees, air, and weather are important," and "The video showed that everyone should be treated fairly when it comes to the environment." These findings suggest the videos communicated practical strategies, foundational ecological concepts, and fairness principles in an age-appropriate manner.

The behavioral intention measure yielded similarly strong results. All children indicated a desire to help protect the environment after viewing the videos. When asked, "What can you do to help the Earth?" and permitted to select multiple responses, 38.5% chose saving water; 30.8% chose planting trees; and 30.8% chose throwing trash in the bin. This demonstrates that the messages were internalized as specific, everyday actions. Collectively, responses from both children and adults indicate that the "Sustainable Storytellers" project produced media that were widely understood, emotionally engaging, and able to foster reflection on responsibility and basic pro-environmental intentions across age groups.

3.3 Integrated Results: Linking Student Learning with Public Impact

Synthesizing evidence from students, adults, and children provides a comprehensive understanding of the "Sustainable Storytellers" project as a collaborative learning and communication platform. Student reflections indicate a shift in perception, viewing design as a tool for raising awareness and generating social impact rather than focusing solely on visual aesthetics. Students prioritized content over appearance and developed skills to translate complex global environmental issues into accessible campaigns for diverse audiences. Responses from adults and children confirm the effectiveness of these efforts: adults largely found the videos clear and relevant to daily life, while children consistently described the stories as easy to understand and enjoyable. Consequently, the project extended beyond internal studio activities to deliver messages that were accessible and meaningful to non-expert audiences.

The project fostered a heightened sense of environmental responsibility among all participants. Students reported an increased awareness of the impact of urban design on "all aspects of people's lives" and connected their work to broader objectives such as the Sustainable Development Goals (SDGs). Among audience members, approximately seventy percent of adults indicated greater responsibility regarding water use after viewing the water video, and a substantial majority expressed support for urgent climate action and the integration of environmental justice into planning processes. All children expressed a desire to protect the environment and identified specific actions such as conserving water, planting trees, and proper waste disposal. Collectively, these results indicate that the project fostered a sense of shared responsibility that bridged the gap between the university and the wider community.

The findings further demonstrate that storytelling served as an effective link between theoretical concepts and practical experience. Most students reported that the project enhanced their understanding of urban–environment theory and improved their ability to analyze academic arguments. Qualitative feedback highlighted the importance of adapting academic readings into scripts and visuals grounded in local Egyptian contexts. Adults indicated that the videos clarified the real-world implications of environmental issues, while children acquired concrete lessons about water conservation, the significance of natural elements, and the value of fairness. Storytelling, therefore, facilitated both the internalization of theory by students and the translation of abstract concepts into relatable experiences for audiences.

The project exemplified constructivist learning within real-world constraints. Students identified scripting, visualization, the use of artificial intelligence tools, and teamwork as key components of their educational experience, while also acknowledging challenges such as unreliable technology, time limitations, and the complexity of communicating concepts

to non-experts. Adults and children served as authentic audiences, providing feedback that enabled students to evaluate and refine their communication strategies. The view among adults that both government and citizens share responsibility for environmental issues, along with strong support for universities' communicative roles, aligns with students' advocacy for deeper collaboration with schools and organizations. Collectively, these perspectives suggest that courses such as ARC 411 can function as micro-hubs for environmental communication, fostering reciprocal reinforcement between student learning and public engagement.

4. Discussion

This section interprets the findings through the lenses of constructivist learning theory, reflective practice, environmental storytelling, and sustainability-oriented design education. It also collects key pedagogical implications for built-environmental curricula and emphasizes this study's findings contributions.

The evidence demonstrates that embedding storytelling in ARC 411 deepened students' understanding of urban–environment interactions and enhanced public awareness. Students were required to translate theoretical readings into scripts and visuals tailored for specific audiences, necessitating the reorganization and reinterpretation of ideas rather than simple recall. Their strong agreement that the project improved their grasp of course concepts, along with comments such as "urban design affects all aspects of people's lives" and "people's awareness is key to improving their environment," suggests that theoretical knowledge was reinterpreted in relation to everyday urban experience and power dynamics. This outcome aligns with constructivist perspectives, which hold that learning is most effective when students actively construct meaning, connect new knowledge to prior experience, and apply it in authentic tasks (Afroz et al., 2023) (Alam, 2023). It also parallels research on environmental-control courses, which finds that integrating sustainability themes into design education encourages students to develop a more holistic understanding of the built environment and its social consequences (Salama, 2012).

For both adult and child viewers, the videos addressed similar conceptual themes from different perspectives. Adults predominantly reported that the media were clear and facilitated understanding of how environmental issues affect daily life. Children indicated that they learned practical lessons, such as how to conserve water, the importance of trees and air, and the value of fairness. These findings suggest that storytelling served as a two-way bridge: students internalized theoretical concepts by expressing them narratively, while audiences comprehended complex environmental issues through locally relevant stories. Research in environmental communication on "sustainable storytelling" in digital climate campaigns similarly demonstrates that narrative forms connecting abstract risks to familiar situations can enhance both understanding and emotional engagement. Collectively, these results support the argument that media-based assignments can be central to conceptual learning in environmental theory courses, rather than serving solely as outreach activities, and can address criticisms that such courses are disconnected from lived experience (Amrhein & Balaban, 2024; El-Halwagy, 2024; Lyu et al., 2026)

A second major theme concerns the reorientation of students' understanding of design. Many students reported that they now "focus more on content… not just on visuals" and view design as "a tool for awareness and social impact, not only as a visual output." This shift aligns with historical accounts of Bauhaus and post-Bauhaus education, which positioned the studio as a laboratory for experimentation with form, technology, and society, rather than solely a vehicle for formalism (Oktan & Vural, 2019). In contemporary computational design education, digital tools are similarly regarded as means to explore new relationships among structure, environment, and people, rather than as automated form generators. The ARC 411 project extends this tradition into environmental media, treating scripts, storyboards, and videos—including those assisted by AI—as legitimate design media through which students examine environmental problems and their communication.

This orientation closely aligns with Schön's concept of the reflective practitioner, who engages in a "conversation with the situation" through drawings, models, and other representations, reflecting on the consequences of each action (Schon, 1983). In ARC 411, the "situation" encompassed not only the urban–environment context but also the knowledge, misconceptions, and emotional responses of both adult and child audiences. By analyzing survey feedback, students could determine whether their representational choices generated clarity, confusion, or motivation, and adjust their practice accordingly. This approach establishes a model of socially engaged design education in which students are accountable to real stakeholders rather than solely to tutors, and where media and communication tasks are considered equally important as studio projects. These tasks do not merely refine finished designs; they foster ethical and rhetorical judgment regarding which stories are told, whose perspectives are highlighted, and how environmental responsibilities are presented.

The project also significantly influenced students' identity formation. Several students reported discovering a preference for visual storytelling, scripting, and video creation over conventional text-based work, and expressed increased confidence in communicating complex topics. Others highlighted learning to "communicate global ideas and challenges in the form of campaigns." These experiences mirror findings from youth climate-storytelling initiatives, where participants report greater agency and ownership over climate narratives. Such developments broaden professional imaginaries: instead of viewing architects and urban designers solely as form-givers, students begin to see themselves as mediators between environmental knowledge and citizens, capable of shaping public attitudes through narrative and visual work. This aligns with broader calls for future-ready graduates who can operate in interdisciplinary, communicative, and advocacy roles across sustainability transitions (Almulla, 2023; El-Halwagy, 2024). To support these identity shifts, curricula should include explicit opportunities for reflection, such as structured debriefs, reflective essays, or learning journals in which students analyze their communicative roles and the ethical implications of representing diverse publics (Schon, 1983).

Students' mixed experiences with AI tools further highlight the necessity of critical digital literacy. While they valued AI's ability to simplify ideas and accelerate visualization, students also reported that systems "got stuck," produced

inaccurate or awkward outputs, and required time-consuming refinement, particularly for voice-overs. These experiences challenge the prevailing narrative of AI as an effortless productivity enhancer. In practice, the tools became sites for judgment: students had to assess whether images or voices were appropriate, sufficiently clear, or ethically acceptable, and to recognize when outputs risked distortion or stereotype. Recent scholarships in design and media education similarly contend that AI should be regarded not as an automatic solution but as a tool requiring careful prompting, evaluation, and editing. Viewed in this way, the difficulties students encountered can be interpreted positively, as evidence that they were not simply outsourcing environmental communication to machines but were developing critical oversight. Pedagogically, this indicates that integrating AI into built-environment education is most effective when its limitations and biases are explicitly addressed, and when students are required to document and justify their use, modification, or rejection of AI outputs, potentially comparing them to analogue or hand-crafted alternatives.

The project also foregrounds the civic role of universities. Adult respondents reported substantial learning and an increased sense of responsibility regarding water use, climate action, and environmental justice, and widely supported the idea that universities should help raise environmental awareness. Children's enthusiastic responses—including enjoyment, comprehension, and intention to act—demonstrate that even small-scale, course-embedded interventions can influence attitudes and imagined behaviors among younger audiences. This aligns with policy discourses, such as national Vision 2030 agendas, which position higher education as a driver of sustainable development rather than merely a provider of technical expertise. However, not all adults reported increased awareness; some may have already been well informed, while others may have found the narratives less persuasive. This diversity underscores that public engagement should be viewed as an ongoing, dialogic process rather than a one-way transfer of knowledge. Consequently, high-impact curricula require mechanisms for incorporating audience feedback into course design, such as co-designed projects with community organizations, iterative revisions of scripts and visuals, and more nuanced evaluation of how different groups interpret and respond to environmental messages.

Synthesizing these themes, several pedagogical principles emerge for built-environment education. First, theory, design, and communication should be integrated within coherent tasks, requiring students to understand environmental concepts well enough to teach them, thereby reinforcing learning through explanation (Alam, 2023; Almulla, 2023). Second, assessment should involve real audiences and external feedback, consistent with constructivist and project-based models that situate learning in authentic activity and with Schön's emphasis on reflection-in-action. Third, media production should be recognized as design work with ethical and rhetorical significance, rather than as peripheral "presentation skills." Fourth, educators should provide structured support for storytelling, AI use, and reflection, acknowledging that students need time and guidance to develop narrative competence, technical skill, and critical judgment (El-Halwagy, 2024). Fifth, projects should be organized as explicit multi-stage processes—draft, pilot, and final artifacts—so that iteration and critique become standard features of both design and communication. Finally, students should be regarded as partners in curriculum development, contributing to the selection of themes, community partners, and impact measures. Collectively, these principles demonstrate how built-environment programs can move beyond content-centric environmental modules toward media-rich, community-engaged, and reflexive pedagogies better aligned with the complex communicative roles architects and urban designers must fulfil in sustainability transitions.

5. Conclusions

This study investigated the "Sustainable Storytellers" project in ARC 411 and examined its impact on student learning and public environmental awareness. The findings indicate that the storytelling project enhanced, rather than diminished, students' academic achievement. Course grades were consistently high, and most students reported that the project deepened their understanding of theoretical concepts and improved their ability to analyze academic texts. Qualitative responses suggest that students began to perceive urban-environmental challenges as issues that "affect all aspects of people's lives" and to regard design as a tool for awareness and social impact, rather than solely a visual exercise. Many students reported developing new interests in scripting, visual storytelling, and campaign design, and described a shift from focusing on appearance to prioritizing content, message, and ethical responsibility. Scripting, visualization, AI tools, and team discussion were identified as key drivers of learning, although students also noted challenges related to AI reliability, time management, and communicating complex ideas to non-experts.

Audience data show that the student-produced media were widely understood and appreciated. Adults found the videos clear and relevant to everyday life, reporting increased awareness of environmental problems, greater responsibility for water use, and strong support for urgent climate action and the inclusion of environmental justice in planning decisions. Children enjoyed the cartoon videos, found them easy to understand, learned specific lessons about water conservation and the importance of natural elements, and expressed a desire to protect the environment through actions such as saving water, planting trees, and proper waste disposal. Adults also strongly supported the idea that universities should contribute to raising environmental awareness. Collectively, these results indicate that the project served as a significant bridge between environmental theory, design education, and community engagement. For students, translating course readings into stories and visuals for authentic audiences fostered a constructivist learning environment, encouraged reflective practice, and supported the development of identities as environmental storytellers and civic agents. For adults and children, the project offered accessible, locally relevant narratives that clarified environmental issues and suggested practical responses.

In summary, this study demonstrates that media storytelling can be integrated into core built-environment courses as a substantive assessment activity that supports conceptual learning and advances the university's civic mission. However, the limited scope of a single course, reliance on self-reported measures, and insufficient detail regarding AI use underscore the need for further comparative and co-designed research to refine and generalize this pedagogical model.

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