2023 Annual Conference & Exposition
Baltimore Convention Center, MD | June 25 - 28, 2023
The Harbor of Engineering Education for 130 Years
ASEE
Paper ID #39333

Work in Progress: Measuring Interdisciplinary Teams´ Sustainable Design with an SDG lense – Case Study

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WIP: Measuring Interdisciplinary Teams´ Sustainable Design with an SDG lens

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Abstract

To overcome the multifaceted problems of the contemporary world, interdisciplinary and sustainable solutions are needed. Research supports that the interaction of different disciplines boosts sustainability in solutions. This research analyzes a sustainable design developed by an interdisciplinary team through the lens of the SDGs. Team members come from different races, ages, and levels of knowledge. This study will use a qualitative approach to better understand the importance of interdisciplinarity in sustainable solutions that align with the SDGs. The results suggest that interdisciplinary designs boost sustainability in multiple SDGs through the same solutions, making interdisciplinary design more efficient and with higher impact to the world. The authors reflect on the future steps that educational institutions could take to form new pedagogical approaches that highlight interdisciplinarity within engineering schools. Implications for research and practice are provided.

Introduction

Today's world faces complex problems such as environmental, social, and economic challenges. In response, many organizations and interdisciplinary teams have shifted their focus toward sustainable design. The Sustainable Development Goals (SDGs) of the United Nations provide a framework for organizations to measure and improve their sustainability efforts. By integrating an SDG lens, interdisciplinary teams can identify the most critical sustainability challenges and develop innovative solutions addressing social and environmental problems.

Interdisciplinarity involves utilizing knowledge and skills from various disciplines to solve problems through multiple approaches [3] .The interaction of the various fields of knowledge transcends the barrier [1] of monodisciplinary and provides new and sustainable solutions to address current and future challenges. The knowledge exchange will positively contribute abilities and skills of students in academic areas.[7]–[10].

Applying interdisciplinary and multifaceted practices in pedagogical methods improves Interdisciplinarity Sustainable Design development and solutions within engineering [11],[12], [13]. Furthermore, integrating knowledge produces an analytical environment to answer questions and problems beyond common disciplinary boundaries [14]. For example, the case study that will be analysed was developed by an interdisciplinarity team that contributed to the

idea of using textile-reinforced concrete. The objective of using TRC is because it would help with several of the UN development goals, such as encouraging inclusive and sustainable industry, efficient use of resources, promoting the design and construction of sustainable infrastructures, and improving people's quality of life.

This article aims to assess the impact of interdisciplinary teams understanding sustainable solutions within the framework of the SDGs through a successful case study by engineering students. The study analyzes a solution proposed by a group of interdisciplinary students in a global concrete competition presented by the American Concrete Institute. The team had diverse backgrounds and levels of experience to facilitate joint learning. In addition, the authors made the proposal considering the UN Sustainable Development Goals.

Background/Framework

Sustainable and innovative solutions are the ideal response to the challenges of the world to change people's lifestyles. These solutions are not obtained based on a singular discipline [3], [17]. As complex solutions are necessary for multifaceted development, interdisciplinary uses multiple academic disciplines and fields of knowledge to obtain a comprehensive understanding [18]. This means that teams with interdisciplinary and multifaceted development use skills and knowledge from different areas of study to create creative and sustainable complex solutions [1]. So, interdisciplinary practices allow different disciplines of knowledge to be related to take advantage of it and solve current global challenges, since its educational and creative process can be completely reinvented.

Thanks to professionals from different fields of study, the boundaries of traditional disciplines can be crossed, new connections are formed, and promising contributions are faced with the problems of the world and beyond [19]. Thus, both students and professionals can harmonize various types of knowledge and be able to reach new and different ways of thinking about the same diatribe [20]. There are five categories in which the benefits and advantages of different interdisciplinary and multifaceted studies can be summarized [1]. These are: providing sustainable solutions to crucial problems, improving current research problems from the root, stimulating a specific disciplinary area, facing and challenging modern knowledge and understanding the real world, and promoting the development of new methodical approaches [21].

For collaboration and interdisciplinary studies, a great barrier that is the need for collaboration of teachers and educators must be eliminated, since it prevents the free interdisciplinary contribution within education [22]. The traditional learning process is based on the concept of "common core" in which students work for the same goal, share similar subjects, and, therefore, will exchange similar ideas [20]. This can lead students and professionals into believing that interdisciplinarity is an irrelevant opportunity within engineering, and therefore apply it with little or no frequency.

Besides, the fact that knowledge is antagonistic between professionals and students results in another great challenge when applying interdisciplinarity within education [23]. This does not allow the diverse disciplines to integrate naturally, but also places a barrier and tries to isolate

them Therefore, for there to be integration of the different disciplines, areas of knowledge must be shared and related, so that the result is sustainable, innovative, effective and generates the most appropriate solution [24]. In this way, academic communities and organizations will be created from interdisciplinary groups with affinity in certain research fields.

Relationship between interdisciplinarity, sustainable solutions and educational methods

Interdisciplinarity contributes closely to sustainability [17]. In September 2015, the United Nations agreed on the need for a more sustainable world, which is why they established 17 Sustainable Development Goals (SDGs) [24]. These address issues such as climate change, sustainable production and consumption, and its pinnacle, sustainable development, focusing on qualitative education as the best way to enact it [26]. Thus, the fourth goal of the SDGs specifically seeks "education for sustainable development" [25]. Sustainable development requires various disciplines, such as science, engineering, medicine, architecture, history, the environment, etc. This is why the SDGs need an interdisciplinary approach [27]. By applying interdisciplinarity within educational pedagogy, students will be able to address "issues that transcend traditional disciplines, involve multiple stakeholders, and occur at multiple scales" [28]. Students and professionals must be prepared with interdisciplinary development to be able to find sustainable solutions to current challenges, and achieve "their purpose of transforming society" [26].

The exchange of ideas between professionals and students occurs through interdisciplinary interactions and generates a positive contribution. Together, interdisciplinary development addresses personal and institutional boundaries by "acting to maintain a sense of ownership and authority over territories of knowledge" [1]. And, an academic and work environment will be created in a methodical way in which professionals and students acquire knowledge from both parties.

For higher education, an extremely important element is interdisciplinary, since it can promote creativity, innovation and synergy through collaboration, teamwork, the application and intellectual dispersion of knowledge and disciplinary boundaries [34]. Some variables that can develop a better interdisciplinary training would be to select the problem to be solved, determining the amount of interaction that is needed between the different study areas and their respective constructive alignment [35]. Subsequently, it has been stated that it is complex to achieve significant advances in the field of interdisciplinary pedagogy when there are no specific disciplines for its participants [36].

It is extremely important to remember that within an interdisciplinary team there should not be hierarchies between the participatory disciplines [38] , but should inhabit respect and mutual contribution to generate new results, approaches and more questions to answer [35]. Therefore, within universities, the development of interdisciplinary education is an explanatory, demonstrative and experimental field, so the urgent need for interdisciplinary action within education needs to be presided over by teachers based on their theoretical purposes [37]. There are no specific models to be able to apply and develop a successful case of interdisciplinarity in education, although it is key for employability and sustainable development [39]. However, problem-based learning (PBL) and project-based learning (PjBL) are better framed for enhancing

students' interdisciplinary competence, as both pedagogies are sympathetic to the collaboration of students from different disciplines [39].

Research objective

This article aims to evaluate the impact of interdisciplinary teams in developing sustainable solutions that meet the SDGs through a successful case of study by a multidisciplinary team of students from different careers and academic levels who participated in a worldwide competition organized by the American Concrete Institute.

Methods

This case study uses a qualitative methodology [40], [41] to explore how interdisciplinary teams contribute to sustainable responses The solution proposed by the students for the concrete solutions competition organized by the American Concrete Institute on an annual and international basis will be analyzed. The solution was presented in an audiovisual lasting 7 minutes, in which the team proposed a solution (link: https://www.youtube.com/watch?v=B2En1SD32WU). The case study examined how Interdisciplinarity helps contribute to Sustainable Design. According to the theory, the case study proposals are: i) The solutions proposed by students from different disciplines, experiences, and academic fields will be reflected in the characteristics presented in this solution, and ii) The solutions proposed by the students that make up the interdisciplinary team in the construction career will have the Sustainable Development Goals proposed by the United Nations as their main characteristic of sustainability.

The competition organized by the ACI aims to seek and find innovative and creative ideas to advance the concrete and construction industry. The general instructions of the contest were to develop a proposal for how concrete contributes positively to the world. The team proposed using textile-reinforced concrete to generate larger spaces in buildings, reducing the use of cement. There were two categories: Highest Overall Score and Most Innovative Design/Development Use of Concrete. Each category was evaluated according to an audiovisual proposal 60% of the qualification would be obtained, and the remaining 40% would be granted through an interview. However, only the top 20 submissions will participate in team interviews with judges. The judges were appointed by the president of the ACI committee S801, who are the ones who developed the rubric to qualify for their respective contests.

Team selection and student work

The team was selected to be an interdisciplinary group. The Civil Engineering professors at the university reviewed the students´ applications. They selected a team of six members: three civil engineering juniors, a first-year student, an architecture student, and a graphic design student. The team also had the participation of a faculty advisor and a weekly meeting of consultants for questions. The team had three weeks to develop the idea and prepare a solution, from initial brainstorming to video production. The advisor supervised, guided, and supported the student´s work, which allowed the team to choose different viewpoints and approaches that maximized the student´s strengths working as a team. One objective was to guide the team to work

interdisciplinary, allowing every student to provide their opinion and input in the sessions, among other strategies [42]. The civil engineering students focused their interest on concrete and new ideas they could work on, while the architecture students contributed their design ideas to fit the concrete proposals of the engineering students and suggested how these elements would give a different perception space. The first-year student was also proposing ideas without the restrictions that knowledge provides. The graphic design student contributed with his creativity by showing how to express all the information investigated in a non-technical language. The interaction of the students to understand each other ideas was a challenge because they had to find ways to express technical ideas in a more accessible way.

Students proposed solution.

The final solution proposed by the team consisted in carrying out a contest using the Textile Reinforced Concrete inside a thin slab so that, in this way, it can be emphasized all the benefits that this construction method will help the environment since it will reduce the percentage of incorporated carbon and as 85% of the expected material would be used, to the economy since fewer resources would be used to produce the same surface area, and to the well-being of the occupants of the structures, since the properties of This material allows to expand the spaces, which will generate feelings of well-being and cognitive development when occupying a structure with CRT. We must not forget the sustainability of this material, since they directly share 6 SDGs, among which 3. Good Health and Well-Being, 8. Decent Work and Economic Growth, 9. Industry, Innovation, and Infrastructure, 11. stand out. Sustainable Cities and Communities, 12. Responsible Consumption and Production, and 13. Climate Action, and 2 SDGs in a less direct way than 10. Reduced Inequalities, and 17. Partnership for the Goals.

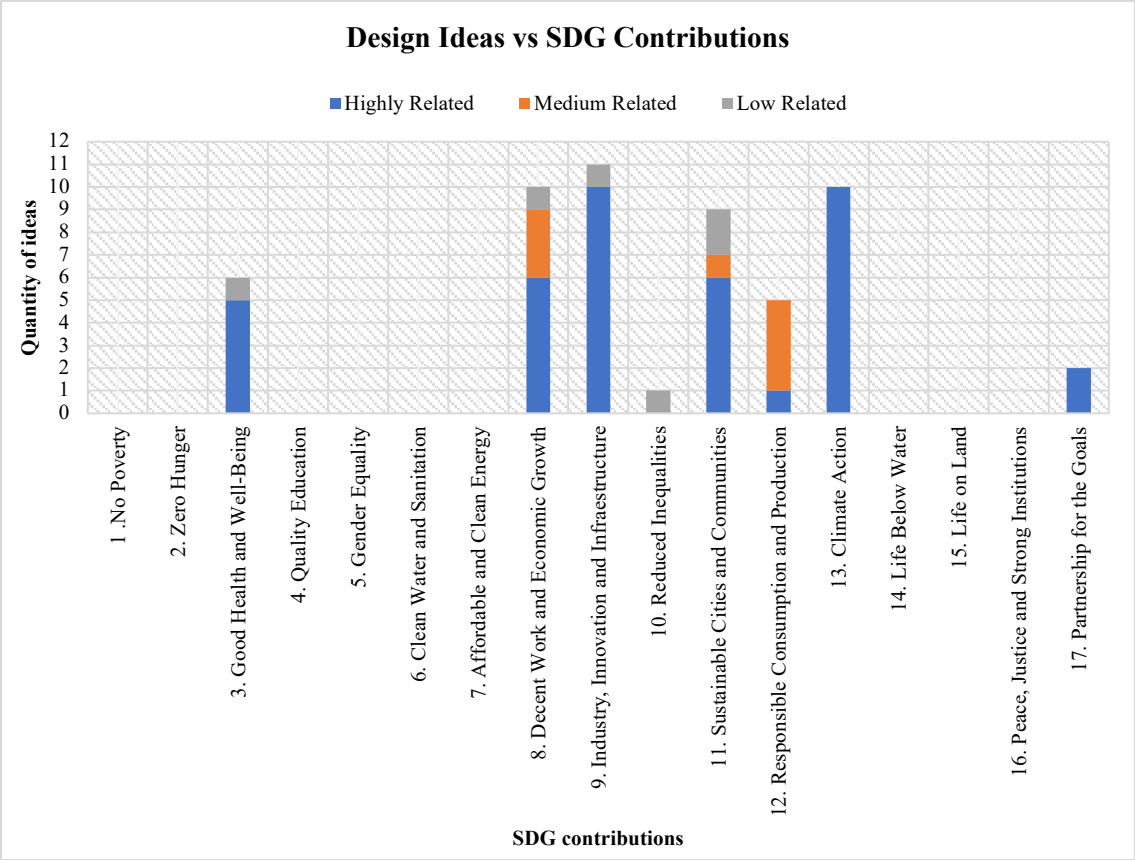
Data analysis and SGDs assessment lens

The three authors of this document repeatedly watched the video to see how each idea in this material was related to the 17 SDGs to analyze the data on the audiovisual material presented in the competition for concrete solutions. Simultaneously, an Excel table was created to register the main ideas about the SDGs. This table summarizes the concept, the time (minutes and seconds of the video), and its relationship with the SDGs. Subsequently, another analysis is carried out to select the different levels of relationship that each idea has with other SDGs, considering that it is placed in red when it has a high affinity, orange for a medium relationship, and green for a low relationship. With this double input matrix, the responses can be organized differently. For this (audiovisual) case study, the matrix shows which SDGs have had the greatest, least, and no impact on each idea. [Annex].

Results

The contiguous results show the participation and relationship of different SDGs with the ideas presented in the Textile Reinforced Concrete video, which were proposed by the interdisciplinary team that won the competition proposed by ACI in the fall of 2020. Of the 17 recognized SDGs, the participation of the SDGs can be divided into three groups that are: high interaction, low interaction, and no interaction, which would represent their level of interaction

with the video proposed in the competition. The table below shows the quantity of ideas of high, medium, and low impact that contributed to each SDG.



The table shows that for the high-level contribution, there are the five SDGs with at least 6 contributions from the design. These five SDGs are N3 Health and Well-being, N8 Decent Work and Economic Growth, N9 Industry, Innovation and Infrastructure, N11 Sustainable Cities and Communities, N13 Climate Action.

The following tables show the ideas and proposals presented in the video chronologically for each SDG, and how they have a high contribution to the solution and the topic that is mentioned.

SDG	Interdisciplinary Design Contribution	Impact
3. Good Health and Well Being	Experience a bigger, wider, and better contributed space, and living outside the box.	High
	The production of 1 ton of cement represents 1 ton of CO2 released into the atmosphere.	High
	The UN announced that these emissions need to fall about 16% in the next 10 years.	High
	Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	Low
	We don't only promote a new way to construction, but we want to change people's lives.	High

As the table above shows, SDG N3 Health and Well-Being, indicates that it is fundamental to guarantee a healthy life and promote the well-being of all at all ages.

SDG	Interdisciplinary Design Contribution	Impact
8. Decent Work and Economic Growth	Architects free their mind to create new designs that revolutionize the space.	Medium
	The UN announced that these emissions need to fall about 16% in the next 10 years.	Medium
	Reduces embodied carbon 5% and can reduce the required concrete by up 85%.	High
	Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	Low
	Designs are quantified according to concrete's cost, but it's a big contaminant.	High
	Sustainable materials are encouraged and will reflect a lower cost than the calculated.	Medium
	Will be rated based on the load size of their design according to their projected cost.	High
	TRC to the spotlight which will trigger new investigative efforts in construction communities.	High
	We don't only promote a new way to construction, but we want to change people's lives.	High

As the table above shows, SDG N8 Decent Work and Economic Growth, mentions that sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all should be promoted.

SDG	Interdisciplinary Design Contribution	Impact
9. Industry, Innovation and Infrastructure	TRC will give the cities the innovation and infrastructure they deserve.	High
	Architects free their mind to create new designs that revolutionize the space.	High
	Reduces embodied carbon 5% and can reduce the required concrete by up 85%.	Medium
	TRC provides ductile strong elements that still possess the flexible behaviour of textile fibers.	High
	Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	High
	Sustainable materials are encouraged and will reflect a lower cost than the calculated.	High
	Will be rated based on the load size of their design according to their projected cost.	High
	TRC to the spotlight which will trigger new investigative efforts in construction communities.	High
	Will be evaluated by the functionality of the structure, and its applicability in architecture.	High
	We don't only promote a new way to construction, but we want to change people's lives.	High

As the table above shows, SDG N9 Industry, Innovation and Infrastructure, encourages building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation.

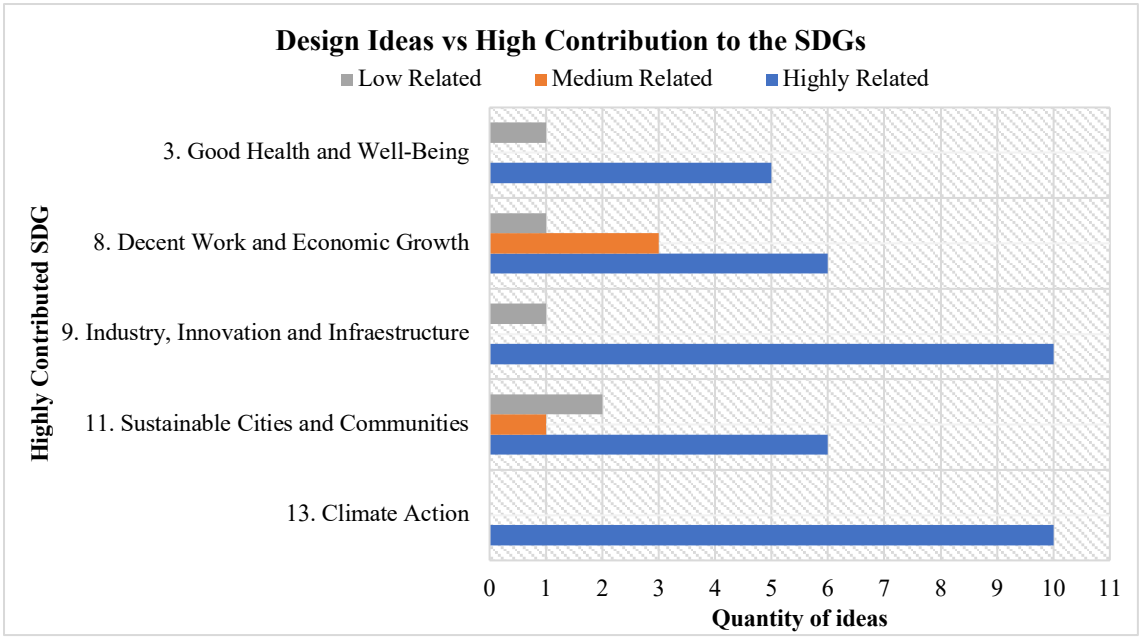
SDG	Interdisciplinary Design Contribution	Impact
11. Sustainable Cities and Communities	Experience a bigger, wider, and better contributed space, and living outside the box.	High
	With building's floor area increasing, it will have an effect on future CO2 emissions.	Low
	Reduces embodied carbon 5% and can reduce the required concrete by up 85%.	High
	TRC provides ductile strong elements that still possess the flexible behaviour of textile fibers.	High
	Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	Medium
	Designs are quantified according to concrete's cost, but it's a big contaminant.	High
	Sustainable materials are encouraged and will reflect a lower cost than the calculated.	High
	Will be evaluated by the functionality of the structure, and its applicability in architecture.	Low

As the table above shows, SDG N11 Sustainable Cities and Communities seeks to make cities and human settlements inclusive, safe, resilient, and sustainable.

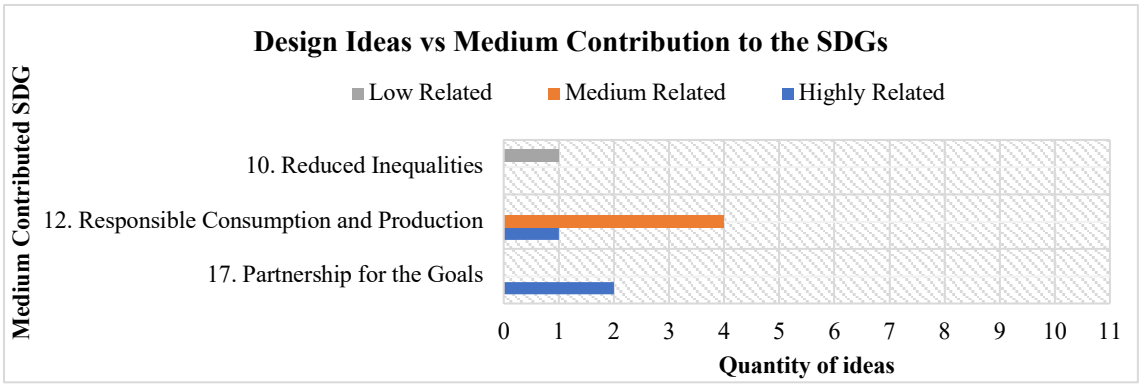
SDG	Interdisciplinary Design Contribution	Impact
13. Climate Action	With building's floor area increasing, it will have an effect on future CO2 emissions.	High
	For 3.75 million buildings, it represents over 10 billion tons of concrete.	High
	The production of 1 ton of cement represents 1 ton of CO2 released into the atmosphere.	High
	The UN announced that these emissions need to fall about 16% in the next 10 years.	High
	Reduces embodied carbon 5% and can reduce the required concrete by up 85%.	High
	TRC provides ductile strong elements that still possess the flexible behaviour of textile fibers.	High
	Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	High
	Designs are quantified according to concrete's cost, but it's a big contaminant.	High
	We don't only promote a new way to construction, but we want to change people's lives.	High

As the table above shows, SDG N13 Climate Action, dictates that urgent measures must be taken to combat climate change and its effects.

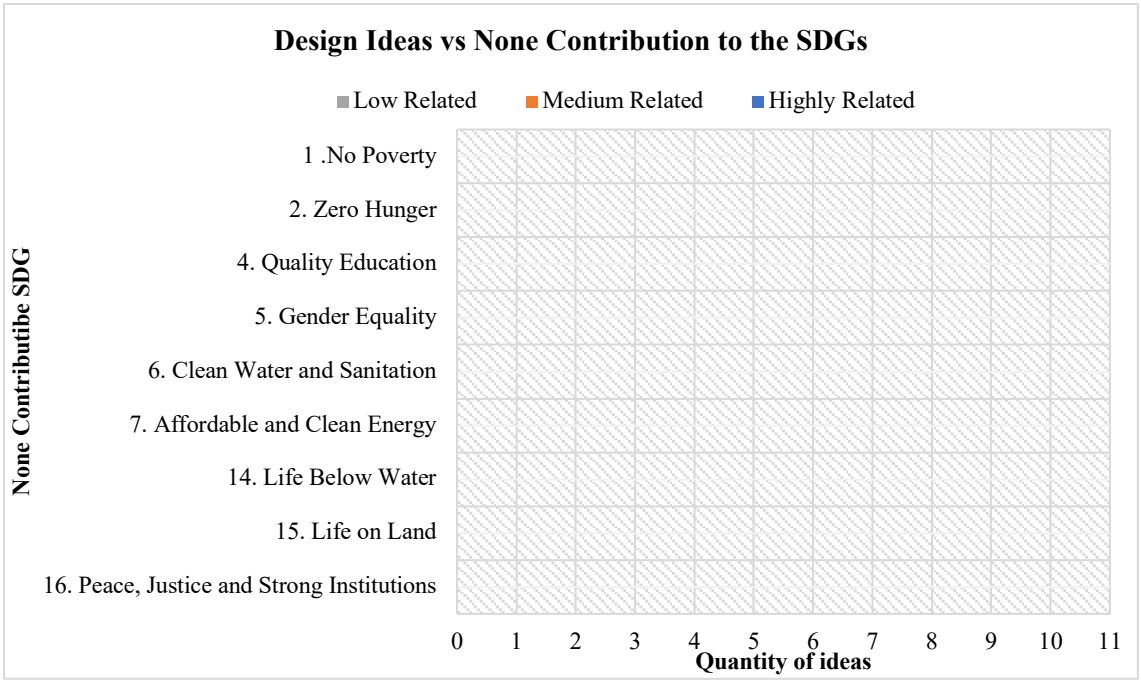
Below is a list of the ideas, and how they link to one or more corresponding SDGs and their level of relationship, but not the level of importance. The following graph can demonstrate how the participation and importance of the idea is brought with the SDGs.



The table shows that for the low level of interaction, there are the 3 SDGs that had an interaction of less than or equal to 5 with the proposed ideas, and they are N10. Reduction of Inequalities, N12 Cities and Responsible Production, and N17 Alliance for the Goals. Data is expressed in the bar chart below.



The table shows that for an inexistent contribution, there are 9 SDG that have not participate with a high, medium or low interaction with the proposed ideas.



Discussion

The contributions that come from interdisciplinary groups require the participation of different disciplines to achieve a sustainable solution [27]. In a timely manner, the fields of engineering need the mixture of professional architects, scientists, economists and financiers to come up with an idea that can be led by the SDGs, since collaboration is a fundamental characteristic of interdisciplinary solutions [30]. And in this study, the solution to use Textile Reinforced Concrete considers various Sustainable Development Goals, proposed by the UN. For academic purposes, the team that presented this case study can be considered interdisciplinary, since it was made up of different disciplines by students of engineering, architecture, economics and finance, animation, and graphic design. Each student was able to collaborate with essential knowledge to achieve a sustainable solution that matches the need to improve both the lives of users and a better use of spaces. The two weeks prior to the presentation of the proposal of this interdisciplinary group of students were very stimulating to accelerate the process of participation of each one and that they could express their ideas and reach a group result.

As an example, it is worth mentioning that both the architects' ideas of how a new large space would improve people's way of living, the engineers' idea of using a reinforced slab system, and the economists' idea of being able to search for a project profitable to the situation, they were able to give birth to the fact that this product can fit in certain aspects with the sustainable development objectives proposed by the UN, since this construction method will improve the way of life and the well-being of the occupants of the structures, it will provide work decent and an economic increase for the region in which these projects are developed, it will give a touch of innovation to the infrastructure by using a material for other more architectural purposes, it will be one of the first cities in which sustainable cities and communities will be created, and will make a difference in climate change as this method will not use the same amount of concrete, which will reduce CO2 emissions by producing m construction supplies.

Additionally, the animation and graphic design student produced, based on what was obtained, an audio-visual material that, quickly, clearly, and concisely, presents the result that was very easy to understand for all types of audiences. It should be noted that the participation of this work team demonstrates the importance of how the combination of different disciplines can produce a better result than expected and that can help future generations, and in the same way, the importance of interdisciplinarity in daily life and how the solutions obtained will be a sample of how groups made up of various disciplines is a way to improve the well-being of people and the world.

For future studies and investigative work, we will seek to understand the Interdisciplinarity Sustainable Design process and the amount of participation that each student had and how their discipline of study contributed. Many new solutions created by the joint work between students and professionals can outshine other brilliant ones due to the amount of information that is shared [18]. However, the lack of communication is the biggest barrier between the fields of education and the labor fields for interdisciplinarity [15], because there will be a difficulty when exchanging ideas to obtain and develop a sustainable preferred solution. Without proper communication, ideas like the TRC can be lost, as well as many of its benefits with the SDGs. To prevent this situation of losing good ideas, good communication must be developed between professionals and students who will form an interdisciplinary team.

In a similar way, one way that a sustainable and interdisciplinary solution can improve its effectiveness would be to promote a communicative and collaborative environment between professionals and students [22]. One way to find this result would be to monitor the individual participation of the members of the interdisciplinary group, since it is not possible to control how they will contribute to the group. Therefore, from the academic collaboration of the individual disciplines they can show results before the proposals can be shared, discussed, and accepted by other members. The creation of a comprehensive and tolerant environment within a team made up of different branches of knowledge will be the result of this process, which will improve the understanding of a problem and how the various answers and solutions can be presented [1].

An important key to be able to achieve the results proposed to the ACI was having an interdisciplinary team, since it was made clear in this study that innovative and sustainable limits do not exist. A structural solution, a design experience, cost balance, and an interactive medium are the different contributions that the different disciplines had in the participation of this team, and the proposed result brings benefits contributed to the Sustainable Development Goals [27], since the contribution that this and future interdisciplinary solutions will have on the world will come to be presented by the exchange of knowledge between professionals and students from different branches of knowledge. One way to promote sustainable development goals is that a scoring system could be added to projects based on how many SDGs they can cover and how relevant they are to the topic being addressed.

As a last recommendation, it is understood that sustainable development and interdisciplinary contributions are directly contributed. The United Nations Organization has proposed 17 SDGs in order to preserve natural resources and the environment for future generations [24]. Therefore, including more SDG in the solutions presented in previous projects would provide additional value to the projects, giving them more profitability, since these additional objectives could

guide the solution of current and future problems contributed to well-being and health, change climate change, structural innovation, and resource allocation [26]. If education is fostered, sustainable development will be both present in today's classrooms and in tomorrow's industries.

Conclusions and Future Work

Today, to preserve resources from the environment and to improve our way of life, innovative, sustainable, and viable solutions must be found and developed to face the challenges of today's world. The combination of knowledge that has its roots in different disciplines will be known as interdisciplinarity, and this, in turn, will have a greater possibility of being able to develop sustainable solutions according to the proposals by the UN. Being able to expose a student group from different branches and areas to interdisciplinary challenges allows this study to understand the upcoming academic and professional collaborations of these members. In this research article, the case study of an interdisciplinary university team that developed an award-winning proposal in the technical concrete contest proposed by the ACI was analyzed, since its result has a great influence with the SDGs proposed by the UN and being an interdisciplinary team that works with sustainable solutions allows finding greater collaborations with each other, whether they are social, environmental, or economic. This solution is contributed to the SDGs: 3, 8, 9, 10, 11, 12, 13, and 17, although in some it has a greater influence than in others, which was also analyzed.

For future work, interviews and observation groups will be carried out with the participants of this team to understand and analyze how their interaction was when working within a team that was outside their academic comfort zone, and thus better understand their process. of cognitive design compared to other experience lenses and to be able to develop better techniques to be able to apply this knowledge in a classroom in the face of various pedagogical challenges. These future studies will have a clear objective, and that is to understand what the process of an interdisciplinary group is like and to understand the effectiveness of the contribution of the different students within the projects. For their part, the researchers will seek the way in which interdisciplinary experiences can be applied in other academic fields, such as undergraduate or postgraduate courses.

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ANNEX: Interdisciplinary sustainable design contribution to SDGs

Relevance	SDG	Interdisciplinary Design Contribution	Minute
High	3. Good Health and Well Being	Experience a bigger, wider, and better contributed space, and living outside the box.	00:44
		The production of 1 ton of cement represents 1 ton of CO2 released into the atmosphere.	01:25
		The UN announced that these emissions need to fall about 16% in the next 10 years.	01:42
		Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	04:57
		We don't only promote a new way to construction, but we want to change people's lives.	06:46
	8. Decent Work and Economic Growth	Architects free their mind to create new designs that revolutionize the space.	00:28
		The UN announced that these emissions need to fall about 16% in the next 10 years.	01:42
		Reduces embodied carbon 5%, and can reduce the required concrete by up 85%.	01:57
		Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	04:57
		Designs are quantified according concrete's cost, but it's a big contaminant.	05:04
		Sustainable materials are encouraged, and will reflect a lower cost than the calculated.	05:27
		Will be rated based on the load size of their design according to their projected cost.	05:39
		TRC to the spotlight which will trigger new investigative efforts in construction communities.	05:58
		We don't only promote a new way to construction, but we want to change people's lives.	06:46
	9. Industry, Innovation and Infraestructure	TRC will give the cities the innovation and infraestructure they deserve.	00:15
		Architects free their mind to create new designs that revolutionize the space.	00:28
		Reduces embodied carbon 5%, and can reduce the required concrete by up 85%.	01:57
		TRC provides ductile strong elements that still possess the flexible behaviour of textile fibers.	02:36
		Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	04:57
		Sustainable materials are encouraged, and will reflect a lower cost than the calculated.	05:27
		Will be rated based on the load size of their design according to their projected cost.	05:39
		TRC to the spotlight which will trigger new investigative efforts in construction communities.	05:58
		Will be evaluated by the functionality of the structure, and its applicability in architecture.	06:16
		We don't only promote a new way to construction, but we want to change people's lives.	06:46

	11. Sustainable Cities and Communities	Experience a bigger, wider, and better contributed space, and living outside the box.	00:44
		With building's floor area increasing, it will have a effect on future CO2 emissions.	01:02
		Reduces embodied carbon 5%, and can reduce the required concrete by up 85%.	01:57
		TRC provides ductile strong elements that still possess the flexible behaviour of textile fibers.	02:36
		Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	04:57
		Designs are quantified according concrete's cost, but it's a big contaminant.	05:04
		Sustainable materials are encouraged, and will reflect a lower cost than the calculated.	05:27
		Will be evaluated by the functionality of the structure, and its applicability in architecture.	06:16
	13. Climate Action	With building's floor area increasing, it will have a effect on future CO2 emissions.	01:02
		For 3.75 million buildings, it represents over 10 billion tons of concrete.	01:17
		The production of 1 ton of cement represents 1 ton of CO2 released into the atmosphere.	01:25
		The UN announced that these emissions need to fall about 16% in the next 10 years.	01:42
		Reduces embodied carbon 5%, and can reduce the required concrete by up 85%.	01:57
		TRC provides ductile strong elements that still possess the flexible behaviour of textile fibers.	02:36
		Evaluate the contribution of design, environmental impact of design, and cost carbon ratio.	04:57
		Designs are quantified according concrete's cost, but it's a big contaminant.	05:04
		We don't only promote a new way to construction, but we want to change people's lives.	06:46
Low	10. Reduced Inequalities	Architects free their mind to create new designs that revolutionize the space.	00:28
	12. Responsible Consumption and Production	For 3.75 million buildings, it represents over 10 billion tons of concrete.	01:17
		The production of 1 ton of cement represents 1 ton of CO2 released into the atmosphere.	01:25
		The UN announced that these emissions need to fall about 16% in the next 10 years.	01:42
		TRC to the spotlight which will trigger new investigative efforts in construction communities.	05:58
		We don't only promote a new way to construction, but we want to change people's lives.	06:46
	17. Partnership for the Goals	The UN announced that these emissions need to fall about 16% in the next 10 years.	01:42
		Will be evaluated by the functionality of the structure, and its applicability in architecture.	06:16
None	1. No Poverty		

	2. Zero Hunger
	4. Quality Education
	5. Gender Life on Land
	6. Clean Water Sanitation
	7. Affordable and Celan Energy
	14. Life Below Water
	15. Life on Land
	16. Peace, Justice and Strong Institutions