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Article

The Role of University Courses in Promoting Sustainable Development Awareness in Saudi Universities

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Abstract

This study aimed to examine how students viewed the degree to which general university courses would help in creating awareness over the concept of sustainability at Prince Sattam bin Abdulaziz University. A quantitative design was used to determine the impact that such courses have on the goals of sustainable development (SDGs) as seen by students studying in the College of Education, at the same institution. In order to verify the reliability and validity of the data collected Cronbach alpha coefficient was used to test internal consistency of the questionnaire responses. In addition, the correlation analysis and multiple regression were also used in order to explore the associations and strength relationships between the study variables and associated dimensions following the approach used by Pearson. In 2024, a survey was conducted to collect data by sending it to 114 students (both male and female) in the College of Education. In the analysis, it was identified that the role of university education in inculcating sustainability awareness among students and their understanding of the material taught in the relevant courses have a statistically significant and strong relation. Also, the results revealed a moderate correlation between the threats faced by sustainability in higher education and the strategies proposed to mitigate them, indicating that barriers exist in relation to the implementation of recommended interventions. On the basis of these observations, the paper highlights the necessity of redesigning university curricula, especially general courses, to incorporate better the concept of sustainability.

Keywords

Sustainable Development, Higher Education, Curriculum Awareness, Perceptions of Students, Prince Sattam bin Abdulaziz University.

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Introduction

The concept of development became central in the twentieth century and was initially related to the establishment of coherent systems of politics and economy. The term started to be commonly employed after the Second World War, most especially in economics, which referred to processes that sought to cause massive changes in society. It later spilled over into politics as a separate field, which involves leading countries into democratic rule. The concept expanded over time to include cultural, social and environmental aspects which would later combine to form the concept of sustainable development. The 1992 Earth Summit in Brazil was a big deal – everyone there agreed we really needed to start doing things in a way that's better for both people and the planet (Tkachenko, 2023).

Due to its implications on individuals and societies, sustainable development has emerged among the most important global issues. The goal is to bring together three key areas: our economy, our society, and our environment. This means we want to boost economic growth and improve people's lives, while also being careful not to overuse natural resources, pollute too much, or harm our planet (United Nations, 2025). At the university, sustainability is promoted using numerous principles and practices that seek to enrich the academic societies and the societies around them. This is backed up by teaching, research, awareness, campus infrastructure and institutional agendas geared towards sustainable practices. In this way, universities have turned into living sustainability laboratories, developing knowledge and awareness not only off-campus but also to support inclusive and sustainable development (Ozsen, Uslu, & Aypay, 2023).

Education has therefore become central to plans to combat long-term environmental, social and economic challenges. Institutions of higher learning are seen as key in equipping future generations with the capacity to live sustainably and also have an intellectual and moral duty to promote sustainable behaviour (Škokić, Jelić, & Jerković, 2025). Being the top level of the educational system, it is believed that the role of universities is at the center of the sustainable development goals, especially in the context of the United Nations 2030 Agenda. Al-Zahrani and Al-Gahny (2020) highlighted their crucial role in promoting sustainability, thanks to their knack for bringing together talented academics and technical experts. Universities also play a role in ensuring sustainability through education, developing leaders, and communicating with the community. They serve as examples of such a role since they practice on campus and apply these examples to broader communities (Genovese, 2022). Introductory classes usually introduce sustainability concepts to students and urge them to use them in practice (Bucht et al., 2022). However, there is little research available on how much the SDGs are being formally integrated into Saudi curricula.

The realisation of SDGs in higher education is felt to be at the heart of maximising the transformative nature of education. Although sustainability seems to be finding its way into the curriculum, its success in augmenting the knowledge students hold regarding the concepts of sustainability has been controversial. Second, it is also shown that integration can enhance the capacity to find solutions to problems and think critically, and it can also enhance the contribution of education to sustainability (Nuha & Sangco, 2024). However, challenges persist. SDG is a very abstract concept and does not leave a student with many opportunities to apply it (Gu, Liu, & Chen, 2022). Similarly, institutional policy and faculty involvement deficiency continues to compromise success of sustainability implementation in instruction. This leads to the issue of curriculum redesign to inculcate knowledge and skills to the students about how to put SDGs to practice.

The research gap here is that, little has been conducted to understand how certain pedagogical interventions can be implemented to achieve the conceptual and applied dimensions of sustainability education. It therefore needs additional studies on the organisational aspects that may enable or inhibit SDG oriented learning in any non-STEM situation irrespective of the level of learning. The paper thus examined the impacts of environmental consciousness and the capacity of general education students to practice sustainability concepts depending on the courses they take in a university (Hong & Hardy, 2022). The aim of the current study was to determine how students perceived how general university courses can be useful towards ensuring sustainability awareness in Prince Sattam bin Abdulaziz University. The results will be used to inform the future design of academic programmes because the study fills a gap in knowledge regarding the role of higher education in contributing to sustainability education in Saudi Arabia. The most significant contribution it brings to the body of knowledge about the role of higher education is that it ensures the implementation of student-cantered methods to enable the UN SDGs to facilitate sustainability literacy (Li, 2025).

This study has more than educational value as it has practical implications in the society. When Saudi Arabia strives to achieve the framework of the Vision 2030 and its educational sustainability goals, more comprehensive national approaches will be required (Leal Filho et al., 2025). Colleges and universities are best placed to support students to improve their knowledge on sustainable development and thus become prepared to deal with the global issues of climate change, inequality, and resource shortage (Platje et al., 2022). To do so, a descriptive and cross-sectional design was utilized, whereby a structured questionnaire was administered to male and females students at Prince Sattam bin Abdulaziz University. Data collected were quantitatively analysed in order to present a true evaluation of the attitude of students.

Statement of the Problem

Sustainable development has now emerged as a universal agenda, and education is placed at the core of its promotion as a social, economic, and environmental development endeavor. Universities have a great role to play in developing the next generation. Not only do they prepare them with the necessary knowledge, but they also imprint in them the importance of being responsible to save our environment, as Hamdan Alghamdi, Alotaibi and Ibrahim (2020) argue. General education courses may also be quite beneficial to assist students in learning more about the concepts and practices of sustainability (Chou, Elken, & Jungblut, 2023). Introductory courses can contribute to and encourage students to consider sustainability in their lives at the introductory level due to multiple reasons (Ebaid, 2021). But, despite the added awareness of the SDGs by universities, what is lacking is how these goals may be cross-functionally applied into academic programmes, in Saudi Arabia.

Very little research has been conducted to investigate how various pedagogical methods can be used to not only enable students to acquire the concept of sustainability, but also to implement it in practice. It goes without saying that additional studies are required on the organisational factors that may either enable or inhibit the process of implementing SDG awareness. This research thus aims at determining the processes of how the general education subjects will empower the students to learn the concepts of sustainability and apply it to the Saudi environment even in Prince Sattam bin Abdulaziz University. The second objective is to find out to what extent such courses increase sustainability knowledge among the students and whether such courses allow students to get a chance to practice. The other research goal is to substantiate the alignment of the overall courses to the international needs of sustainable development and the 2030 Agenda and to evaluate the role they play in the formation of attitudes among students and their readiness to become active participants in the process of environmental protection.

Study Objectives

1. To determine the level of awareness that students in Prince Sattam bin Abdulaziz University have of the importance of general education courses towards attainment of the SDGs.
2. To explore the main issues related to the integration of the concepts of sustainable development in the general curricula of universities.
3. To recommend viable measures and interventions that may help overcome the obstacles to the implementation of the SDGs in general university courses.

Study Questions

1. How can university education contribute to the realisation of Saudi Arabia vision 2030 through creation of sustainability culture and empowering the students with the required skills?
2. What do students of Prince Sattam bin Abdulaziz University expect when considering the potential of general education courses in helping to achieve SDGs?
3. What are the greatest obstacles to the integration of the concepts of sustainable development in university programs?
4. How do we use mechanisms and practical resolutions to overcome the impediments to implementing the SDGs in the general courses of the university?

Study Significance

Basing on the research problem and the purposes it will fulfill, the study in question has the importance which can be summarized as follows:

Theoretical Importance

1. It helps to shed light on the role of the general courses at the university in promoting achievement of the SDGs in institutions of higher learning.
2. This research looks at the views of students at the Prince Sattam bin Abdulaziz University and thus contributes to existing research on the realization of SDGs in educational settings.
3. It gives an understanding of the relationship between academic content and sustainable development, which will be useful in upcoming research on how to match academic programmes with sustainability strategies.
4. The research also adds a great contribution to the academic discussion of the role of education in facilitating the SDGs implementation in the context of environmental justice, social justice, and economic development.

Practical Importance

1. Practically, this research will provide a list of recommendations to educators, academic leaders, and decision-makers at Prince Sattam bin Abdulaziz University.
2. It evaluates the role of general education courses in supporting the SDGs, and it is hoped that curriculum design and pedagogy can be improved, with the result that society will be provided with the skills and knowledge it needs to implement the principles of sustainability.
3. It is believed that the findings will help institutional planners conceptualise and align their outputs to global sustainability agendas.
4. In this sense, this study also helps to formulate policies concerning curriculum development, so that the university programmes are actively involved in the realization of the SDGs.
5. Additionally, the study emphasizes the role of institutions of higher learning in equipping responsible citizens with both consciousness and ability to participate in the concept of sustainable development.

Study Scopes

General Scope

This research will determine the importance of general courses in the College of Education at Prince Sattam bin Abdulaziz University in developing awareness and promoting the United Nations SDGs. It investigates how much the courses improve the knowledge, awareness and ability of students to implement the SDGs, and which aspects of the working curriculum need to be reinforced in order to facilitate the more effective integration and implementation of sustainability education.

Human Scope

This research only covers the students of the College of Education at Prince Sattam bin Abdulaziz University and specifically those pursuing general courses to give a holistic approach of how such courses can help students work towards the realization of the SDGs.

Subject Scope

The scope of the subject is limited to an analysis of the role of general courses offered in the College of Education at the University of Prince Sattam bin Abdulaziz in promoting awareness and assisting in achieving the SDGs.

Geographical Scope

In this research, the sample was limited to the College of Education at Prince Sattam bin Abdulaziz University in the Kingdom of Saudi Arabia, and only students enrolled at this college were selected to give a perfect insight into the effectiveness of the educational system in this particular context.

Temporal Scope

The data used in this study was conducted between the years 1445 AH to 2024 AD, during which all the surveys, interviews, and other related tools were conducted to gather the current perception of the students at the Prince Sattam bin Abdulaziz University.

Methodology

A quantitative research design was used to determine how effective general education courses are in promoting the SDGs, according to the students of the College of Education at Prince Sattam bin Abdulaziz University. It was considered to be the most appropriate method to deal with massive data and to generate statistically valid findings that may guide the future course development. The data were collected with structured questionnaires that ensured effective organisation and allowed careful measurement and analysis, increasing the overall external validity of the results. Cronbach alpha coefficient was used to test the reliability and validity of questionnaire.

Study Design and Procedures

The study was cross-sectional in nature, collecting data among students at one point in time to present a quick evaluation of their views on the role of general education courses in the SDGs. A structured questionnaire was used to collect data by paying it electronically and giving students a four-week time frame to complete it so that as many students as possible participated and were included. Consideration was also given to ethical issues such as informed consent and preservation of the privacy of the responses of participants. Since data were gathered only once without further follow-up, the design allowed assessing the degree of awareness and recognition of the importance of general education courses among students to promote the SDGs. Moreover, the cross-sectional methodology allowed comparing the attitudes of different groups of students, i.e., students of different academic years and departments, therefore, allowing to gain a more comprehensive and sophisticated picture of the student attitudes.

Theoretical Framework

Sustainable Development Goals

The SDGs consist of 17 goals, which are developed in the context of UN work and approved formally in 2015. Such targets include poverty eradication, hunger eradication, quality education, gender equality, health and well-being, affordable and clean energy, access to clean water, economic growth, innovation, reduction of inequalities, sustainable cities, robust infrastructure, oceans protection, climate action, life below water conservation, life on land, and promotion of peace and justice. The majority of them will be aimed at realization by 2030 and constitute the basis of sustainability in educational, economic, and social aspects (Vindigni, 2024).

General Education Courses

University general education courses are structured so that they offer a basic level of knowledge to their students in the social sciences, the humanities, the natural sciences, and mathematics. The courses are designed to ensure that students become more competent in both academics and transferable skills (particularly, critical thinking, communication and problem-solving) so that they can become competent and responsible citizens. Nevertheless, the degree to which the concepts of sustainability are integrated and enforced in these courses is ambiguous in most situations.

Effectiveness Assessment

In the educational setting the assessment means the extent to which a programme or a course has reached its intended learning outcomes. In that sense, scientists use these assessments to identify how well general education courses can promote the knowledge of the SDGs among students and faculty members (Rodriguez-Sanchez, 2023).

People's Opinions

Faculty and students give their views on the relevancy of these courses and their educational role. This research paper particularly examined their perceptions of the connection between general education classes and the global SDGs and how classes in this area can help to strengthen awareness and competences in relation to sustainable development (Weybrecht, 2021).

College of Education

A College of Education is a unit in a university or other institution of higher learning which is dedicated to preparing future teachers. Its main role is to provide programmes that train teachers, administrators and other

professionals in the education industry. In Hail University, the College of Education plays an important role in providing general education courses that also help in improving the sustainable development agenda (Nordén, 2024).

Literature Review

This section has been constructed by synthesizing a series of research works, where a systematic approach has been used to critically present the key findings of the research works. The review established bridges between the selected studies by systematic identification of the differences and similarities and by applying the comparative language to describe the relationships that exist. The strengths and limitations of all the studies were critically assessed, and a synthesis of the academic literature used was produced in a coherent manner. The lack of experimental research on the academic performance of institutions with SDGs incorporated into their programs, as well as the relative lack of suitable frameworks to make the implementation of SDGs in higher education programmes ethically relevant, was also another research gap identified during the review.

This is the gap that is filled in the analysis below. The researchers performed a systematic search of 10 articles that investigated the implementation of SDGs in higher education, both general and STEM (science, technology, engineering and mathematics) education. The gathered evidences were taken into account in order to answer the question whether it is possible to incorporate these aims into educational programmes and what benefits or harms they can bring. Things that were common and those that differ between the results and the direction to be followed in the future were discussed. Alfathy et al. (2024) also note that teachers were delighted with the implementation of Education for Sustainable Development (ESD) because 42% of courses in the first year included this practice. All these findings suggest that the overall education has a positive impact on the outcomes of sustainable development. This research, however, was concentrated on institutional support, but not on STEM-based teaching. On the other hand, Nuha and Sangco (2024) also affirmed that the problem solving skills of students in physics and the chemistry subject area were higher, following the introduction of SDGs in STEM programmes. Corrochano et al. (2022), on the same note, also conducted a review of matters concerning general education and discovered that exposure to SDGs increased the level of awareness of students regarding the concept of sustainability. Both research studies reported that giving students enough time to learn during the experience can help improve their interaction and engagement (also shown by Sheila et al., 2021). Although the curriculum was better in making the students learn about the world matters, the curriculum failed to help much in teaching the students practical skills hence the introduction of applied learning.

Prior literature focuses on the goals that general education teachers are seeking after introducing SDGs into the courses. Teachers found the aims helpful and themselves found challenges in using them. This does not align with other observations that promote the institutional approach to deliver SDGs. Assuming the existence of appropriate support and strong rules within the university, Buerkle and her co-authors (2023) believe that professors will be enthusiastic to take part and be actively involved. A prior study investigated whether their general education courses could teach global sustainability-related competencies to students and found the results in line with the prior literature. Students were introduced to SDGs in theory and little practice. This is consistent with commentaries that highlight the significance of imparting applied skills and could be applied to justify the reasons why limiting general education to abstract theoretical knowledge should not be practiced in an effort to promote the sustainability objectives.

Summary of Key Findings and Theme

Literature available suggests that the use of the SDGs in higher education, either as a general education course or a STEM-based programme, does have a positive impact on student awareness regarding sustainable development. Application of theoretical knowledge to practice, however, is a relatively agreeable constraint and hence the necessity to incorporate more experiential procedures and simulations. Also, introduction of high institutional support and contribution of faculty members have been cited as two significant contributory factors to effective implementation of global sustainability objectives in university curricula.

Points of Agreement and Disagreement

It is widely agreed that implementing the SDGs in the context of higher education increases student awareness and contributes to the acquisition of corresponding skills. However, issues have been expressed about the effectiveness

of current curricular designs. Have you ever questioned yourself whether science, technology, engineering and math classes do matter? Well, one study conducted by Guzmán-Valenzuela et al. (2022) has discovered that in fact, STEM education is very effective at developing needed skills. However, the punchline here is that, in a separate study by Oltra Badenes and others, also in 2022, researchers noted that, in most normal school environments, students do not receive sufficient opportunities to actually apply what they are learning. It is as though one has all the ingredients of a delicious cake and no oven in which to bake the cake. Faculty role is a controversial issue, and extensive institutional policy is called upon, but Tafese and Kopp (2025) noted difficulties related to the practical aspects of implementation. In this research, the past works were heavily relied upon to formulate the conceptual framework of the study and define the scope of inquiry. Preliminary results aided the determination of a research gap, including that there were a few empirical studies examining academic performance in SDG-integrated curricula and evidence-based applied ethical frameworks. The precise problem formulation and the guarantee of correspondence between the goals of the study and the modern tendencies in the field of sustainability-oriented institutions of higher learning were based on a systematic review of previous works. These studies also provided their findings to enrich the analysis and discussion by integrating and critically comparing the findings using structured methods to focus on similarities, differences, and influencing factors. This process helped to gain a better critical appreciation and make some interpretations that are consistent with current literature, as well as connect theoretical frameworks to practical examples.

Study Population and Sample

The research sample was composed of about 5,000 students (male and female) undertaking the College of Education at Prince Sattam bin Abdulaziz University. Stratified random sampling was used to select a sample of 114 students to represent all the departments in the college. This method of sampling allowed gathering full information on the extent to which students were of the opinion that general education courses allowed them to achieve the SDGs. A structured questionnaire was used to measure the knowledge students had of the SDGs and their perception of the current curriculum, as well as the challenges that might stand on the way to the realization of the goals of general education. To capture qualitative and quantitative data, the questionnaire was made of Likert scale questions, multiple choice questions and open ended questions. It has been done electronically to make it more convenient and able to gather data in a shorter time.

Study Instruments: A self-administered electronic questionnaire was used as a primary tool of data collection. The questionnaire was designed in the following sections:

Demographic Data: Gathering information about the students in terms of their age, gender, academic year, and department.

Sustainable Development Goals: Evaluation of the knowledge of students about the SDGs and their assessment of its value.

Due to the advantages of general education courses in increasing awareness and supporting the practical implementation of the SDGs, it is necessary to examine the effectiveness and relevance of general education courses.

Difficulties and Problems: locating the primary impediments to the implementation of SDGs into general education programmes.

A pilot test was done to test the relevance, reliability and clarity of questionnaire items and to align the questions with the objectives of the study using a small number of students (n = 30). The findings of this pilot were applied to conduct the refinement and finalisation of the questionnaire before the administration of the questionnaire to the full target sample.

Results

Results are presented in combination with a range of key themes, which include the demographic picture of the study sample achieved through the use of statistical methods, as well as the evaluation of questionnaire validity and reliability, and bivariate correlation analysis of the study variables and associated dimensions. Also, analysis of multiple regression of the variables in each dimension was carried out. The results of these analyses are summarised as follows:

Demographic Characteristics

Table 1 shows the distribution of general demographic factors of the students who attended the College of Education of Prince Sattam University and took part in the questionnaire. As to the demographic structure of the study group, the information in the table characterizes both the educational and demographic features of the 114 students, who participated in the study. The largest sample was made up of female students who took about 86 percent of the sample. The second and eighth academic levels recorded the highest at approximately 49.1 and 28.1 percent, respectively. About 14 percent of the participants were male.

Table 1: *Frequency and Percentage Distribution of the General Demographic Characteristics of the Students Participating in the Study.*

Variable	Category	Frequency	Percent (%)
Gender	Male	16	14.0
	Female	98	86.0
Academic Level	First Year	10	8.8
	Second Year	56	49.1
	Third Year	3	2.6
	Fourth Year	5	4.4
	Fifth Year	2	1.8
	Sixth Year	3	2.6
	Seventh Year	3	2.6
	Eighth Year	32	28.1
Overall Academic Grade	From 2.5 to less than 3	5	4.4
	From 3 to less than 3.5	16	14.0
	From 3.5 to less than 4	25	21.9
	From 4 to 5	68	59.6
Number of Courses Studied Including Sustainable Development Topics	None	62	54.4
	1-2 Courses	47	41.2
	3-4 Courses	4	3.5
	5 or More Courses	1	0.9
Participation in University Activities Related to Sustainable Development	Never Participated	95	83.3
	Participated Once	14	12.3
	Participated 2-3 Times	3	2.6
	Participated More than 3 Times	2	1.8
Level of Knowledge of Sustainable Development Concepts Before University Courses	No Knowledge	39	34.2
	Limited Knowledge	48	42.1
	Moderate Knowledge	21	18.4
	High Knowledge	6	5.3
Main Source of Knowledge on Sustainable Development Concepts	University Courses	47	41.2
	University Activities	7	6.1
	Social Media	34	29.8
	Social Initiatives	2	1.8
	Training Courses	5	4.4
	Other	19	16.7
Previous Participation in Projects or Initiatives Related to Sustainable Development	Yes, Inside University	5	4.4
	Yes, Outside University	31	27.2
	Yes, Both Inside and Outside University	4	3.5
	No Participation	74	64.9

Source: Statistical analysis of the study sample.

About total success in academic work, the highest percentage of students (59.6 percent) are between 4 and 5 and 21.9 percent between 3.5 and below 4. All this suggests that more than 81.5 percent of the sample has a high-to-moderate level of academic performance. Regarding awareness of sustainable development, the results

show that a remarkably high percentage of students (54.4 percent) had not studied any course related to sustainable development issues. This shows that there is an enormous gap in the reporting of topics on sustainability in the existing curriculum. Just 41.2 percent of the students had taken one to two courses that included relevant issues of sustainability. These findings highlight the apparent gaps in the curricula towards sustainable development and it can be concluded that the programmes offered are outrageously limited in terms of facilitating courses which are built on sustainability principles. This scenario explains the significance of specifying curriculum contents especially in general education courses to sensitize students and arm them with knowledge and skills to contribute significantly to the development of the SDGs.

The Table 1 also shows that most students (64.9%), had not participated in any project or initiative related to sustainable development either at or outside the university, which reflects a minimal degree of practical participation in the field. Even though 27.2 percent indicated that they were involved in activities outside the university, there was no significant involvement with activities as only 4.4 of the study sample were involved. These results demonstrate that there exists a definite mismatch between theoretical teaching and practice of the topics of sustainable development in the College of Education at the Prince Sattam bin Abdulaziz University. This highlights the need to encourage student-initiated projects and activities that can facilitate the SDGs at the campus. Most students showed little or no knowledge of the concepts of sustainable development (76.3%), in terms of previous knowledge. Curriculum courses were also found as the most important source of knowledge that allowed students to gain some knowledge about sustainable development (41.2%), and then social media platforms (29.8%).

Validity and Reliability of the Questionnaire

Table 2 shows the reliability coefficients using Cronbach alpha of all the dimensions of the study and the general reliability of the questionnaire. As the table shows, the Cronbachs alpha of the whole questionnaire was about 0.943, which is a high-reliability and internal-consistency measure of the instrument. In order to evaluate the suitability of the questionnaire as a valid instrument to measure and respond to the objectives of the study, validity was determined by identifying whether the instrument was able to produce analysable, reliable and objective data. I also estimated the square root of the coefficient of the Cronbach alpha to have a further look at the validity of the tool and the higher the coefficient, the higher the validity of the instrument in collecting data. The square root of the total Cronbach alpha (0.943) in this research was equal to 0.971 which is close to one, this proves that the items used in the questionnaire are effective and measure and reflect the aims of the study.

Table 2: *Reliability Coefficients of the Study Instruments According to Cronbach's Alpha.*

Dimension	Number of Items	Cronbach's Alpha Coefficient
First	10	0.949
Second	10	0.961
Third	10	0.923
Fourth	10	0.925
Overall Reliability	40	0.943

Source: Statistical analysis of the study sample.

Bivariate Correlation Analysis

In this research, Pearson correlation coefficient was used to identify the nature and strength of the relationships between the variables in the study and their respective dimensions. A significant positive and statistically significant correlation was determined to exist between the first and the second dimension, coefficient being approximately 0.853, which was significant at the 1 percent level, as in Table 3. On the other hand, the first dimension showed a weak correlation with the fourth dimension (0.233) at the 5 percent significance level, whereas no significant correlation was found between the first and third dimensions (-0.067), or between the second and third dimensions (-0.075), indicating that the third dimension does not act as a substitute of the first and second dimensions. Also, the analysis found that the third and fourth dimensions had a moderate positive relationship (0.588) at the level of 1 percent, which may indicate some degree of similarity in the content addressed by these two dimensions. All in all, the results show that there are statistically significant correlations between some of the dimensions, which confirms the internal consistency of the instrument, and the interdependence of some aspects, whereas other dimensions are independent of each other.

Table 3: *Pearson Correlation Coefficients Among Study Dimensions.*

	First- Dimension	Second-Dimension	Third-Dimension	Fourth-Dimension
First Dimension	1			
Second Dimension	0.853**	1		
Third Dimension	−0.067	−0.075	1	
Fourth Dimension	0.233*	0.174	0.588**	1

Source: Statistical analysis of the study sample. (*) Significant at 0.05, (**) significant at 0.01.

The procedures were repeated, and a multivariate regression analysis was performed to estimate the Y-intercept and Y-coefficient of the model.

The study used a multiple regression analysis in line with the study objectives and the accompanying data collection and analysis, and it was divided by each of the specific objectives as follows:

First Objective: The role of university education in achieving the vision 2030 of Saudi Arabia by instilling a culture of sustainability and inculcating relevant skills into the students.

The first dimension variables focus on the contribution of university education to the realization of Saudi Arabia Vision 2030 through developing a culture of sustainability and empowering students with skills to support the growth of student awareness of concepts and practices involving sustainable development. The entire ten independent variables in this dimension (X1 to X10), underwent multiple regression analysis to establish the strength of the influence of the independent variables on the dependent variable. There is a significant correlation between the independent variables (X1-X10) and the dependent variable (R = 0.829) and 68.6% of the variance was attributed to the independent variables (R2 = 0.686). On another level, the F value of ANOVA (F = 22.554) shows that the overall model is significant, meaning that it offers an acceptable explanation of the dependent variable. Further analysis of the regression coefficients shows that the only variable that is statistically significant at the 1 percent level is the seventh variable stating that university curricula fail to focus on the critical thinking skills needed to solve sustainability problems. The coefficient on this variable (B = 0.152) highlights the influential power of this variable in explaining the dependent variable, which is stated as: explaining the role of university education in utilising Saudi Arabia Vision 2030 by fostering a sustainability culture and providing students with the skills necessary. By contrast, the other variables were not statistically significant at the 1 or 5 percent level, suggesting that they did not significantly predict the dependent variable.

Table 4: *Multiple Regression Analysis Determining the Effect of the First Dimension Variables on the Dependent Variable.*

R	**R Square**	**Std. Error of the Estimate**			
0.829	**0.686**	**0.33150**			
		ANOVA			
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Regression		24.785	10	2.479	22.554	.0000
Residual		11.319	103	.11000		
Total		36.104	113			
		Coefficients				
Model		**Unstandardized Coefficients**		**T**	**Sig.**	
		B	**Std. Error**			
(Constant)		1.828	.131	13.921	.000	
X1		-.062	.050	-1.224-	.224	
X2		.048	.047	1.024	.308	
X3		.064	.054	1.188	.238	
X4		.071	.060	1.191	.236	
X5		.043	.055	.780	.437	
X6		.007	.057	.124	.902	
X7		.152	.035	4.309	.000	
X8		.062	.048	1.282	.203	
X9		.035	.046	.750	.455	
X10		.105	.062	1.679	.096	

Source: Statistical analysis of the study sample. (*) Significant at 0.05, (**) at 0.01.

Second Objective: To identify the key problems with the sustainable development implementation in university general education programs and highlight the significance of the strategic frameworks related to the global best practices and the Vision 2030 adopted by Saudi Arabia.

The second objective aimed at evaluating how students of Prince Sattam bin Abdulaziz University think that general courses can help them in realising their development goals. In this section, the authors explore how student perceptions at the College of Education about the usefulness of general courses in supporting development objectives affect the usefulness of general courses in promoting awareness about the implications and practices of sustainable development. X20-X11 are the independent variables of this dimension. Table 5 shows the outcomes of the multiple regression model performed to identify the effect of the independent variables included in the second dimension (X11-X20) on the dependent variable, which is the level of attitude of Prince Sattam bin Abdulaziz University students towards the effectiveness of general courses to achieve SDGs. The results indicate that the predictors have a strong positive association with the dependent variable (X11-X20) (R = 0.791) with an R 2 of 0.626, which can explain 62.6 percent of the variance. In the ANOVA analysis, the model was found to be statistically significant with F value of about 17.273 and indicates the model was appropriate in explaining the relationship between the variables. But when the regression coefficients were analysed, none of the independent variables had a significant value of less than 5 percent.

Table 5: *Results of Multiple Regression Analysis Measuring the Effect of the Second Dimension Variables on the Dependent Variable.*

R	**R Square**	**Std. Error of the Estimate**
0.791	**0.626**	**0.36186**

ANOVA

Model	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Regression	22.618	10	2.262	17.273	0.000
Residual	13.487	103	0.131		
Total	36.104	113			

Coefficients

Model	**Unstandardized Coefficients**		**T**	**Sig.**
	B	**Std. Error**		
(Constant)	1.939	.143	13.552	.000
X11	.081	.057	1.418	.159
X12	.113	.069	1.625	.107
X13	-.024	.085	-.281-	.780
X14	.053	.066	.791	.431
X15	-.013	.065	-.207-	.837
X16	.088	.067	1.304	.195
X17	.090	.049	1.820	.072
X18	.051	.077	.660	.511
X19	.025	.061	.402	.689
X20	.029	.067	.431	.667

Source: Statistical analysis of the study sample. (*) Significant at 0.05, (**) at 0.01.

Third Objective: To define what prevents integration of the ideas of sustainable development into the general curriculum of a university.

The third dimension explored the barriers to the full incorporation of the concept of sustainable development in the general courses provided by the university and how it affects the success of these general courses in equipping students to learn and implement the concepts of sustainability. X21-X30 are the independent variables of this dimension. Table 6 indicates that the independent variables X21-X30 and the dependent variable correlate moderately (r = 0.504), with R2 = 0.254, meaning that the two variables accounted 25.4 percent of the variation. ANOVA was used to demonstrate the significance of the model (F [?] 3.506) and prove that it is appropriate to illustrate the correlation. Nonetheless, additional analysis of the regression coefficients indicated that all the independent variables were not statistically significant at a level of 5 percent.

Table 6: *Results of the Multiple Regression Analysis to Measure the Effect of the Third Theme Variables on the Dependent Variable.*

R	R Square	Std. Error of the Estimate
0.504	0.254	0.51138

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	9.168	10	.917	3.506	0.001
Residual	26.936	103	.262		
Total	36.104	113			

Coefficients

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	2.472	.250	9.905	.000
X21	-.089	.064	-1.376	.172
X22	-.036	.085	-.422	.674
X23	.094	.064	1.466	.146
X24	.073	.098	.749	.456
X25	.062	.077	.803	.424
X26	.087	.074	1.181	.240
X27	.104	.075	1.389	.168
X28	.005	.112	.048	.962
X29	.073	.087	.840	.403
X30	-.037	.081	-.454	.651

Source: Statistical analysis of the study sample. (*) Significant at 0.05, (**) at 0.01.

Fourth Objective: To recommend a series of mechanisms and working solutions to the challenges of sustaining development objectives in the general university courses.

Table 7: *Results of the Multiple Regression Analysis to Measure the Effect of the Fourth Theme Variables on the Dependent Variable.*

R	R Square	Std. Error of the Estimate
0.689	0.474	0.42924

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	17.127	10	1.713	9.296	0.000
Residual	18.977	103	0.184		
Total	36.104	113			

Coefficients

Model	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	1.409	.261	5.410	.000
X31	.026	.084	.309	.758
X32	.054	.054	1.000	.319
X33	.114	.063	1.808	.074
X34	.062	.110	.560	.577
X35	-.050-	.083	-.599-	.550
X36	.075	.079	.944	.348
X37	.101	.079	1.277	.205
X38	.065	.086	.762	.448
X39	-.006-	.066	-.083-	.934
X40	.131	.086	1.513	.133

Source: Statistical analysis of the study sample. (*) Significant at 0.05, (**) at 0.01.

The fourth dimension will look at the effects of putting forward a set of mechanisms and possible solutions to help in the integration of development objectives in general university courses on the effectiveness of such course in helping students to increase their awareness of developmental concepts and practices. To determine the effect of independent variables on course effectiveness, the independent variables X31-X40 were analysed. In Figure 7, multiple regression shows that it is significantly correlated with the dependent variable (r = 0.689) and has an R2 of 0.474, meaning that 47.4 percent of its variance is explained by X31-X40. ANOVA was essential to prove the relevance of the model (F = 9.296): the model explains the dependent variable. But further analysis of the regression coefficients revealed that not a single independent variable was statistically significant at the 5 percent level.

Discussion

The Pearson correlation coefficient analysis revealed a range of associations and level of statistical significance between the dimensions analyzed. A positive correlation of significance at the 0.01 level was found between the first dimension, The Role of University Education in Promoting Sustainability, and the second dimension, The Extent of Incorporating Sustainability Concepts in Curricula. This result is compatible with Liu, Watabe and Goto (2022), who believed that the introduction of sustainability ideas in higher education programs significantly improves the learners awareness about the principles of sustainable development. It was also identified that the third and fourth dimensions had a moderate positive correlation, indicating that there is a partial overlap of the barriers to sustainability implementation and the available strategies to reduce these barriers, and the need to target institutional and structural barriers in higher education.

The multiple regression finding reflected the effect of certain independent variables on fluctuations of dependent variables. Specifically, one of the statistically significant predictors of the first objective of the research was the lack of focus on the development of students critical thinking in the university curriculum. A prior study argued that critical thinking skills need to be developed to instil awareness of sustainability and encourage the corresponding behaviour. This dimension was strengthened by the fact that the model had a high explanatory power (R2 = 0.686). In the second objective, the relationship identified between the independent and dependent variables was significant, but Hübscher, Hensel-Börner and Henseler (2023) observed that multiple interconnected factors affect student awareness of sustainability and may not be well reflected in the quantitative measures used in this study.

In the third and fourth objectives, the explanatory power of the independent variables had a relatively low value. In the model that investigated the difficulties encountered in the implementation of sustainability in the general university classes, only a quarter (25.4) of the variance in the dependent variable was explained, and none of the independent variables were found to be significant. This is consistent with Mahmoudi-Dehaki and Nasr-Esfahani (2025) who noted that sustainability in higher education is complex by nature and that it often goes beyond the traditional academic frameworks and therefore cannot be measured using normal measurable indicators. With regard to the suggested mechanisms to resolve the challenges identified, the model accounted about 47.4% of the variance; but, the individual independent variables were not statistically significant. This implies that the suite of mechanisms need to be refined and integrated further and support Lo Presti et al. (2024), who proposed participatory and holistic approaches to be adopted effectively in the implementation of sustainability initiatives in the context of higher education.

Conclusion

Universities play a very central role in ensuring sustainable development through the integration of the concept of sustainability in the education, research and operations of the university. University general courses, especially introduction-level courses, can be one of the initial fora through which consciousness-raising and awareness of sustainability concepts can be encouraged in students. These courses serve as a starting point to the introduction of the SDGs and to motivate students to practice sustainability principles at the individual level, as well as at the institutional. Nevertheless, it is not clear to what extent such courses are relevant to SDGs and, in particular, in Saudi institutions of higher learning. The study aims to fill this gap, as it will determine how effective the general courses, offered by the Prince Sattam bin Abdulaziz University, are in fostering sustainability among students. In addition, it looks at how the courses reflect the 2030 Agenda and how they affect the environmental

thinking and behaviour of the students. The quantitative design was used to collect data through a structured questionnaire on 114 students of the College of Education. Reliability was tested by the Cronbach alpha method, Pearson correlation, and multiple regression methodology to examine the association between variables. Findings demonstrated that there was a strong connection between the awareness of students and how university education could enable sustainability and moderate connections were observed between the perceived difficulties and strategies proposed. There were weak and non-significant relationships between some of the dimensions, which implies conceptual independence. The individual influence was limited by institutional problems in favor of the importance of qualitative follow-up. Most of the proposed mechanisms worked best when holistically applied, highlighting the importance of a holistic, integrated approach in line with Saudi Arabia Vision 2030.

Study Recommendations

Several important recommendations are presented based on the goals and conclusions of the research. To begin with, the concept of sustainability must be formally and methodically integrated into the university curricula, and especially in general education classes. Secondly, students are recommended to have more opportunities to work with sustainable development themes in their graduation projects, particularly in the College of Education at the Prince Sattam bin Abdulaziz University. Thirdly, the campus atmosphere must be changed into a learning laboratory where learning becomes practical and sustainability can be studied through practical experience and application. Fourthly, more efforts should be directed towards the translation of sustainability ideas into practical activities and less on teaching them in a theoretical manner. Lastly, the research notes the need to build institutional cooperation through enhancing partnerships between and among universities, private businesses, and civil society organisations in creating and executing sustainable education programs.

Study Limitations and Future Directions

The use of an electronic questionnaire might have limited the number of students who participated as they had less access to or knowledge of using a digital questionnaire. Also, the particular study of students of the College of Education limits the externalization of the results to other faculties or institutions of higher learning in Saudi Arabia. This possible limitation to the extent of insight into the attitudes and behaviours of students might also have been due to the use of solely quantitative methods, which perhaps could prove to be useful in future studies using qualitative methods. It is recommended that future research utilize qualitative research designs to examine the lived experiences of both students and faculty when considering the application of sustainability within campus. It would be helpful to expand the sample to several universities operating in various disciplines and regions to carry out more robust comparative analyses and to increase the generalizability. In addition, longitudinal studies are suggested to measure the outcomes of sustainability curricula on the practices of graduates in the labour market and identify the long-term results.

Implications of the Study

The results of this research project have practical implications to various stakeholders, especially those in the decision-making and educational policymaking sectors in institutions of higher learning in the Kingdom of Saudi Arabia. Besides this, the findings are useful in informing the individuals involved in the curriculum design to help them improve the programmes offered in universities by incorporating the concept of sustainability.

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