Malaysian Polytechnic Students and The SDGs: A Study on Knowledge, Attitude & Practice

S.Thivviyah Sanmugam[1, a)] and Nithya Periasamy[2, b)]

[1]*General Studies Department, Politeknik Banting Selangor,Malaysia* [2]

Department of Mathematics, Science & Computer, Politeknik Ungku Omar, Ipoh, Malaysia

[a)]Corresponding author: thivviyah@polibanting.edu.my
[b)] nithya@puo.edu.my

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Abstract. The United Nations' Sustainable Development Goals (SDGs) provide a worldwide framework for tackling essential issues including poverty, inequality, climate change, and quality education. Malaysian polytechnic students, as future engineers, technologists and professionals, are essential in promoting sustainable development through innovation and practical solutions. This study seeks to assess the Knowledge, Attitude, and Practice (KAP) on the SDGs among Malaysian polytechnic students. Grounded in the KAP paradigm, the research examines how students comprehend the objectives, assess their significance, and convert this understanding into concrete behaviours. A quantitative survey methodology was utilised, employing a structured questionnaire that was prepared and validated according to the KAP framework. The instrument was administered among students from several Malaysian polytechnics. The questionnaire assessed three main variables: awareness of the 17 SDGs, attitudes towards sustainability and global citizenship, and the sustainable behaviours practiced by the respondents. The data obtained from the questionnaire were examined using SPSS software, utilising descriptive statistics and Spearman's rho coefficient correlation to investigate the correlations among the variables. Initial findings suggest that although students exhibited high level of knowledge and favourable attitudes towards the SDGs, their sustainable activities do not consistently correspond with their knowledge and attitudes. The results hold significant value for educators, policymakers, and curriculum developers in harmonising technical education with sustainable development objectives.

Keywords: sustainable development goals, education for sustainable development, KAP model

INTRODUCTION

Sustainable development has become one of the most pressing and intricate concerns of the 21st century. In reaction to increasing global issues like climate change, poverty, inequality, and resource depletion, the United Nations launched the 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDGs). These objectives establish a holistic and cohesive framework to reconcile social equality, economic development, and environmental sustainability (United Nations, 2015). This global perspective acknowledges that all societal sectors, including educational institutions, must participate in creating a sustainable future. Tertiary education institutions are essential in cultivating future leaders and professionals capable of tackling sustainability concerns through critical thinking, ethical responsibility, and technical innovation (Fadeeva et al., 2014).

As a signatory to the 2030 Agenda, Malaysia has made substantial progress in aligning its national development policies with the Sustainable Development Goals (SDGs). The Malaysia Sustainable Development Goals Voluntary National Review (VNR) 2021 confirms the nation's dedication to incorporating SDGs into national strategies, encompassing educational reform (Economic Planning Unit, 2021). The Malaysian Ministry of Higher Education (MOHE) acknowledges that education serves as both an objective (SDG 4) and a mechanism for attaining other objectives, thereby prioritising the incorporation of Education for Sustainable Development (ESD) within the curriculum and practices of higher education institutions (Chee Sern et al., 2021).

In this context, polytechnics function as essential platforms for integrating sustainability values into the skill sets of future technologists, engineers, and industry professionals. These institutions provide proficient human capital for national advancement and promote practical, industry-relevant education that can stimulate innovation

for sustainability (Yunus et al., 2024). According to Sulaiman et al. (2021), Polytechnics and community colleges have actively engaged in promoting and executing sustainable development programs. In addition, in compliance with the government's instruction, Polytechnic Malaysia made a substantial advancement by developing the POLYGreen Blueprint. It was the only blueprint established by the Malaysian Ministry of Education in 2015. Further in 2019, in response to the changing environment and governmental policy goals, the Blueprint SmartGreen Polytechnic Community College 2021-2026 (BSGPC) was established to advance the sustainability agenda (Adi Badiozaman, 2021). This blueprint serves as a framework to enhance the commitment to sustainability and guarantee the ongoing success of polytechnics and community colleges in addressing the challenges of modern globalisation (Jamaludin, 2023).

Notwithstanding the increasing recognition of the sustainability agendas in the Malaysian polytechnics and community colleges, empirical investigations into the perceptions and implementations of these global objectives by students, especially in technical and vocational education and training (TVET) environments like polytechnics, are still few. It is imperative to evaluate students' knowledge levels, their perceptions of the significance of the SDGs, and their participation in sustainability-related behaviours. The Knowledge, Attitude, and Practice (KAP) framework, extensively utilised in public health and educational research, offers a systematic and comprehensive method for comprehending how knowledge shapes attitudes, subsequently affecting actions (Launiala, 2009). The KAP approach, when applied to the SDGs, elucidates discrepancies between awareness and action, a challenge frequently noted in sustainability education (Biasutti & Frate, 2017).

Recent studies have investigated understanding of the Sustainable Development Goals among university students in diverse worldwide contexts. Leiva-Brondo et al. (2022) discovered that university students in Spain perceived that the SDGs are vital for their daily lives however they do not fully understand the 17 goals and their current implementation. Ovais (2023) performed a survey with 205 higher educational institution students from central India and found that although many students endorsed sustainability measures, few incorporated these into their daily practices. Similarly, in a study carried out by Afroz & Ilham, (2020), it was reported that Malaysian university students exhibited positive attitudes towards SDGs, although they showed low performance in practicing it in real-world contexts. Nevertheless, most of this research concentrated on general university populations instead of technical or polytechnic students, whose curriculum prioritises experiential learning and practical knowledge.

In the setting of Malaysian polytechnics, research on the Sustainable Development Goals (SDGs) is limited. Existing studies primarily concentrate on institutional activities, role of polytechnic institutions in promoting sustainability and in terms of their economic impact (Sukarti & Norizan, 2023). Due to the distinctive features of polytechnic education which focuses on skills-oriented learning, industrial partnerships, and community involvement, polytechnic students have the capacity to serve as agents of sustainability in both professional and societal realms. The current study examines Malaysian polytechnic students' Knowledge, Attitude, and Practice (KAP) in relation to Sustainable Development Goals (SDGs). Comprehending student's knowledge, attitudes, and practices (KAP) levels can guide curriculum reform, pedagogical approaches, and co-curricular initiatives that foster sustainability-oriented mindsets and behaviours.

RESEARCH METHOD

The present study utilised a questionnaire survey based on previous studies (Afroz & Ilham, 2022; Borges, 2019). The questionnaire consisted of 4 sections. Section A comprised demographic background of the students while Section B, C and D consisted items related to knowledge (10 items), attitude and practice levels (14 items each) towards the SDGs. The Cronbach's Alpha reliability test was conducted. As presented in Table 1 below, all three variables of knowledge, attitude and practice towards SDGs showed good and acceptable internal consistency (Taber, 2018).

TABLE 1-Reliability Test

Variables	No. of Items	Cronbach's Alpha
Knowledge	10	.710
Attitude	14	.966
Practice	14	.879

In addition, a pilot test was carried out with 15 students to assess the clarity, relevance and validity prior to the main data collection. Based on the feedback obtained, 3 items were re-worded to enhance clarity. The questionnaire was distributed online via Google Form Malaysian polytechnic students selected using purposive and snowball sampling methods. While both purposive and snowball sampling are non-probability methods and thus limit the generalisability of findings, the study's aim is not to produce statistically generalisable results, but rather to generate context-specific insights into the Knowledge, Attitude, and Practice (KAP) regarding the SDGs. In qualitative and exploratory quantitative research, the depth of information and relevance to the research objectives often take precedence over representativeness (Patton, 2015). Moreover, prior research on sustainability education has successfully employed similar approaches to reach information-rich cases, particularly in educational settings where the research population is niche and context-specific (Lozano et al., 2015; Biasutti & Frate, 2017). A total of 176 students from 5 different polytechnics responded to the survey. Data collected were then analyzed descriptively using Statistical Package for the Social Sciences (SPSS) software.

TABLE 2-Spearman's Rho Correlation Value Interpretation

Spearman's rho	Correlation
≥ 0.70	Very strong relationship
0.40-0.69	Strong relationship
0.30-0.39	Moderate relationship
0.20-0.29	Weak relationship
0.01-0.19	No or negligible relationship

*This descriptor applies for both positive and negative relationships.

Besides, for inferential analysis, Spearman's rho correlation coefficient was carried out to examine the relationships between variables (knowledge with practice and attitude with practice). Table 2 above displays the interpretation of Spearman's rho correlation value to indicate the strength level between the variables tested (Dancey & Reidy, 2007).

RESULTS AND DISCUSSION

The study collected data from 176 Malaysian polytechnic students across multiple departments to ensure a representative sample. The distribution of respondents from each department is presented in Table 3. Male respondents were slightly higher than the female respondents, with a percentage of 53.7% while the remaining 46.3% were female respondents. Most of the students had ages from 23 and above (36.6%) and 21 to 22 (32.6%). Among the respondents, 57.7% are degree students while 42.3% are diploma students. The majority are from the Department of Civil Engineering (35.4%), followed by Mechanical Engineering (27.4%), with other departments having smaller representations.

TABLE 3-Demographic Backgrounds

Variables		Percentage (%)
Gender	Male	53.7
	Female	46.3
Age	17-18	1.1
	19-20	29.7
	21-22	32.6
	23 and above	36.6
Education level	Diploma	42.3
	Degree	57.7
Department	Department of Mechanical Engineering	27.4
	Department of Electrical Engineering	2.9
	Department of Civil Engineering	35.4

Department of Aircraft Maintenance Engineering	8
Department of Commerce	12.6
Department of Information Technology and communication	9.1
Others	4.6

The level of Polytechnic students' knowledge on SDGs is presented in Table 4. Most of the students responded positively, ranging from 76% to 98.9%. The highest percentage of positive responses (Yes) was for item K6 "Environmental protection, economic growth, and social equity are the fundamental elements of a nation" and K7 "Healthy oceans and seas are essential to our existence" with the same percentage of 98.9%. Besides, around 97% of the students reported that they understand the meaning of sustainability, the effect of overusing natural resources, the importance of using renewable energy and access to a good education to achieve sustainable development goals.

The reason behind this could be that the Department of Polytechnic and Community College Education's (JPPKK) proactive efforts in championing sustainable development initiatives. Besides incorporating green curriculum into polytechnic study program since 2019, the implementation of Blueprint SmartGreen Polytechnic Community College 2021-2026 (BSGPC) further amplified polytechnic and community colleges commitments to integrate elements of sustainable development into their institutional activities. Furthermore, polytechnic and community college's active participation in national and international sustainable award competitions like the PolyCC SustAward, Malaysia GPM Sustainability Award and UI GreenMetric World fosters not only sustainability awareness but also an environmentally conscious campus for students (Jamaludin, 2023).

TABLE 4-Percentages of Students' Knowledge on Sustainable Development Goals

#	Items	Yes (%)	No (%)
K1	I have heard about the term "Sustainable Development Goals (SDGs)" before.	76	24
K2	I recognize that the meaning of the word "Sustainability" is the ability to be maintained at a certain rate or level.	97.7	2.3
K3	I am aware of the fact that Sustainable Development Goals are targeted to be achieved by the year 2030	81.7	18.3
K4	The overuse of natural resources is affecting the well-being of future generations.	97.7	2.3
K5	To achieve sustainable development, all the people in the world must have access to a good education.	97.1	2.9
K6	Environmental protection, economic growth, and social equity are the fundamental elements of a nation.	98.9	1.1
K7	Healthy oceans and seas are essential to our existence.	98.9	1.1
K8	Increased use of renewable resources can reduce greenhouse gas emissions.	97.7	2.3
K9	Income inequality is a global problem that requires global solutions.	95.4	4.6
K10	Maintaining good relationships with various countries is crucial to preserve peace around the world.	96.6	3.4

The results in Table 5 indicate that Malaysian polytechnic students' attitudes exhibit an alignment with the values and principles of sustainability regarding the Sustainable Development Goals (SDGs). A significant proportion of students agreed or strongly agreed with most items, notably regarding equitable healthcare access (item A2 - 83.5%), gender equality (item A5 - 80.7%), cultural respect (item A8 - 86.9%), and the necessity for enhanced sustainability awareness among polytechnic students (item A3 - 84.1%). These findings corroborate prior research suggesting that young adults are progressively prioritising inclusive and fair social practices (Afroz & Ilham, 2020; Borges, 2019). Likewise, environmental issues garnered significant favourable responses, with 86.3% of students expressing worry (item A7) and 83.5% recognising the influence of climate change on water scarcity (item A6).

In addition, students demonstrated strong agreement for the roles of educational institutions and government in advancing sustainability. Over 80% agreed that both governmental bodies and research and educational institutions (item A12 & A13) ought to augment sustainability initiatives, aligning with Abo-Khalil's (2024) call for collaborative efforts between various stakeholders to foster sustainable development. Similarly, sustainable measures at the individual level such as energy saving (item A10 - 81.8%) and waste reduction (item A9 - 74.4%) attitudes received strong agreement, though with marginally less excitement than social issues. The results

highlight a positive attitude towards sustainability among polytechnic students, facilitating focused interventions to convert awareness into persistent sustainable practices.

TABLE 5- Percentage of Students' Attitudes Towards Sustainable Development Goals

#	Items	SD*(%)	D*(%)	N*(%)	A*(%)	SA*(%)
A1	Reducing poverty and hunger in the world are more important than increasing the economic welfare of industrialized countries.	1.7	0.6	22.7	34.1	40.9
A2	I believe all members of society should have access to high-quality, free basic healthcare.	1.1	1.1	14.2	30.1	53.4
A3	I feel it's important to increase polytechnic students' awareness of the Sustainable Development Goals.	1.1	0.6	14.2	27.3	56.8
A4	I feel basic environmental courses should be a part of our polytechnic curriculum.	2.3	1.7	15.9	34.1	46
A5	I think in society, males and females should be treated equally in all aspects of life.	1.1	1.1	16.5	27.3	53.4
A6	I agree that climate change (rising global temperature) is leading to more water shortages.	0.6	0.6	14.8	33.5	50
A7	I am personally concerned about environmental issues.	1.1	0	12.5	33.5	52.8
A8	I believe that individuals from all cultural backgrounds deserve equal respect.	1.1	0.6	11.4	26.7	60.2
A9	I make an effort to reduce my electricity consumption at home/my place.	1.7	1.7	14.8	35.8	46
A10	I try to reduce the amount of waste at home by collecting materials that can be recycled.	1.1	1.1	22.7	24.4	50
A11	I believe that strong and adaptable infrastructure is key to a thriving community.	1.1	0.6	14.8	34.1	49.4
A12	The government should take greater account of sustainability within their political decisions.	0.6	0	13.1	33.5	52.3
A13	Research and educational institutions (like polytechnics) should take greater account of sustainability in their activities and campaigns.	0.6	0	14.8	32.4	51.7
A14	I believe that participation in a sustainable lifestyle will bring peace and justice globally.	0.6	0	13.6	33.5	51.7

*SD=Strongly Disagree, *D=Disagree, *N=Neutral, *A=Agree, *SA=Strongly Agree

The results from Table 6 indicate that while polytechnic students demonstrate a generally positive attitude toward the SDGs, the actual practice of sustainable behaviors varies across different actions. High engagement is seen in energy-saving habits, with 74.4% of students often or always switching off electrical appliances when not in use (item P7), and 76.7% consistently turning off air-conditioners and lights after class (item P8). Water conservation is also notably practiced, as almost 60% reported often or always conserving water at their place (item P4).

In terms of waste management and recycling, the findings are more moderate. Around 34.1% of students reported that they always discard recyclable materials separately, while another 43.2% reported they only sometimes do so (item P3). Similarly, avoiding plastic straw usage (item P1) is practiced sometimes by 58.5%, but only 33% report doing it often or always, indicating partial adoption of this habit. Carrying reusable bags (P2)

shows balanced practice, with 59.1% indicating they often or always bring reusable bags, though 30.7% still do so only sometimes.

TABLE 6- Percentage of Students' Practice Levels on Sustainable Development Goals

#	Items	N*(%)	R*(%)	S*(%)	O*(%)	A*(%)
P1	I avoid using plastic straws at restaurants/cafes.	1.1	7.4	58.5	16.5	16.5
P2	I bring my own reusable bag for grocery shopping.	4.5	5.7	30.7	30.1	29
P3	I discard recyclable material (e.g., plastic bottle, newspaper, glass) separately at home.	6.8	15.9	43.2	16.5	17.6
P4	I conserve the use of water supply at my place.	0.6	5.7	34.1	23.9	35.8
P5	I treat people from all caste, creed, and religion equally.	1.1	0.6	27.3	22.2	48.9
P6	I prefer public transport rather than a private one.	4.5	11.9	44.3	22.2	17
P7	I switch off electrical appliances at my home that I don't need when I am not around.	0	3.4	22.2	19.3	55.1
P8	I turn off the air-conditioner and lights of the classroom after the class finishes and gets empty at my polytechnic.	0.6	1.7	21	15.9	60.8
P9	I am willing to utilize renewable energy.	0	1.7	30.7	25.6	42
P10	I avoid using animal skin products.	3.6	5.1	26.7	15.3	46.6
P11	I am interested to pay more for environmentally friendly products.	2.3	4	34.1	27.3	32.4
P12	I have taken courses related to environmental sustainability.	4.5	9.1	39.2	19.3	27.8
P13	I participate in events (e.g., seminar, talk, workshops) that relate to environmental sustainability.	5.1	13.1	43.8	19.9	18.2
P14	I talk about environmental sustainability with my friends and family.	3.4	10.8	39.2	23.3	23.3

*N=Never, *R=Rarely, *S=Sometimes, *O=Often, *A=Always

When it comes to social sustainability, most students show strong inclusive values: 71.1% often or always treat people equally regardless of caste, creed, or religion (item P5). However, environmentally conscious consumer behaviour is less common. A similar pattern is observed in avoiding animal skin products (item P10), where 61.9% often or always avoid them, while 26.7% practice it only sometimes.

Participation in formal sustainability-related education and outreach activities is relatively moderate. Only 47.1% of students have often or always taken courses on environmental sustainability (item P12) while 38.1% have actively participated in events or workshops related to environmental sustainability (item P13). Therefore, polytechnic institutions should consider taking proactive measures to enhance students' engagement in sustainability related programs and activities.

Talking about sustainability with friends and family (item P14) also remains moderate, with 46.6% engaging often or always in such discussions. Interestingly, while 67.6% of students are willing to utilize renewable energy (item P9), only 59.7% reported that they either always or often prefer to pay more for eco-friendly products (item P11). This may possibly be due to accessibility or affordability issues. Preference for public transport over private vehicles (item P6) is also limited, with just 39.2% using it often or always. Therefore, the overall practice level of students varies across activities and ranges from 'sometimes' to 'always'.

TABLE 7-Correlation Between Knowledge and Practice and Attitude and Practise

Correlation between	N	Spearman's rho correlation coefficient	Significance (p-value)
Knowledge and practice	176	0.029**	0.703
Attitude and practice	176	0.323**	0.000
Knowledge and attitude	176	0.068**	0.371

**Correlation is significant at the 0.01 level (2-tailed).

The table presents the results of a Spearman's rho correlation analysis examining the relationships between knowledge, attitude, and practice among 176 students. The findings indicate that there is a weak and nonsignificant positive correlation between knowledge and practice ($\rho = 0.029$, $p = 0.703$) (Table 7), which indicates that having knowledge about SDGs alone does not strongly influence polytechnic students' sustainable behaviors. Students may need to learn how to apply resources effectively, rather than just possessing knowledge about them. Similarly, the relationship between knowledge and attitude was also weak and non-significant ($\rho = 0.068$, $p = 0.371$), suggesting that awareness of SDGs does not necessarily translate into more positive attitudes. In contrast, the correlation between attitude and practice is moderate and statistically significant level towards SDGs ($\rho = 0.323$, $p < 0.001$) (Table 7) implying that students who hold stronger pro-sustainability attitudes are more likely to engage in sustainable behaviours. This finding aligns with previous research which emphasizes that while knowledge is foundational, it is the affective domain of attitudes and values that plays a more crucial role in driving sustainable behaviour (Yusof et al., 2020).

CONCLUSION

The findings indicate that polytechnic students possess a high-level knowledge and positive attitudes regarding the Sustainable Development Goals (SDGs). However, when it comes to putting these goals into practice, there's a noticeable drop-off. The data reveal only a weak link between what students know about the SDGs and how much they apply that knowledge in their daily lives. This means that simply knowing about the SDGs isn't enough to inspire action. On the other hand, students who have a more positive attitude towards the SDGs are much more likely to engage in sustainable practices, as shown by the stronger correlation between attitude and practice. This suggests that fostering a positive mindset might be key to encouraging more sustainable behaviors. It should also be noted that differences in environmental education and sustainability initiatives across institutions may contribute to varying levels of SDG awareness and implementation among students. Therefore, it would be valuable for future research to look more closely at what prevents students from turning their SDG knowledge and attitudes into real, consistent action for sustainability practices.

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