

# Sustainability course impact on medical students' environmental projects and perceptions

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## Abstract

Environmental degradation presents an increasing global risk, creating the need to provide health care in an environmentally sustainable way. The literature emphasizes a need for the inclusion of sustainability education in medical curricula. This study aimed to firstly evaluate the quality of sustainability projects developed by students who completed an online elective course compared with those of students who did not enroll, and secondly to explore fifth-year medical students' perceptions of the course. Researchers developed an online elective course on sustainability for fifth-year medical students. The baseline knowledge of learners was checked by pretesting. A quasi-experimental design was adopted where projects of learners who completed the course were compared to those who did not enroll in the course. Then, a cross-sectional survey was conducted to explore the perception of learners by the end of the course. Our results show

that 338 students enrolled in the course. The learners' post-course projects were statistically significantly better in the group who completed the course ( $p=0.01$ ). Most students were willing to enroll in more courses about sustainability (87.6%). Most of the students (97.6%) agreed that the course helped them to improve their sustainable environmental practices. Additionally, a significant number of students (42.9%) disagreed that the university involves them in limiting its negative impact on the environment. Learners who completed the sustainability course achieved better on their projects than their peers who weren't enrolled on the course, and they developed a positive perception towards sustainability. As sustainability is becoming an emerging competency in medical education, there is a need for more such relevant educational activities.

**Keywords:** sustainability, elective, curriculum, medical students

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## Introduction

Climate change and environmental degradation represent escalating threats to global public health. This means that healthcare professionals need to be equipped to deliver care sustainably. Future physicians need to understand the complex interplay between environmental change and health to protect their patients and to deliver clinically sound care that is simultaneously environmentally responsible, in line with global goals such as SDG 3 (Good Health and Well-being), SDG 6 (Clean Water and Sanitation) and SDG 12 (Responsible Consumption and Production). The COP 27 and COP 28 conferences emphasized the need to embed sustainability principles and skills across all professions and parts of society to effectively implement global climate action goals.<sup>1</sup> Integrating principles of sustainability and environmental

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awareness into medical education curricula is thus fundamental to achieving this goal.<sup>2-4</sup>

Sustainable healthcare minimizes the environmental impact of medical services without compromising the quality and equity of care for current and future populations.<sup>2,5</sup> Despite increasing recognition of its importance, the integration of sustainability concepts into medical education remains inconsistent worldwide.<sup>6</sup> A comprehensive global survey of 2,817 medical schools across 112 countries revealed that only 15% included formal instruction on climate change and health in their curricula.<sup>6,7</sup> This educational gap raises concerns about how well future physicians will be prepared to address health challenges exacerbated by climate change and environmental degradation.<sup>2</sup>

In response to this critical need, prominent organizations like the Association for Medical Education in Europe have advocated for competency-based education in sustainable healthcare.<sup>6,7</sup> In 2018, the General Medical Council (GMC) incorporated sustainable healthcare into its 'Outcomes for Graduates' framework, requiring medical graduates to demonstrate competency in applying sustainable healthcare principles, methods, and knowledge to clinical practice.<sup>2,8</sup> The GMC defines sustainable healthcare education as "the process of equipping current and future health professionals with the knowledge, values, confidence and capacity to provide environmentally sustainable services through health professions education".<sup>6,8</sup> While this directive has prompted UK medical schools to ensure graduate competency, a subsequent evaluation by the Planetary Health Report Card found that one-third of UK medical curricula still excluded teaching on sustainable healthcare.<sup>8</sup>

The implementation of sustainable healthcare education in undergraduate medical programs faces several documented barriers. Academics frequently cite an overcrowded curriculum as the primary obstacle.<sup>9</sup> Additional challenges include a perceived lack of faculty expertise in sustainable healthcare, insufficient institutional support, organizational hierarchies, and inadequate assessment methodologies.<sup>6,10</sup> In contrast, educators frequently cited seamless integration of sustainability topics into existing curricular domains as a major facilitating factor.<sup>9</sup>

Quality improvement (QI) is a cornerstone of modern medical education. Integrating sustainability principles into QI projects offers a unique and practical opportunity to teach students about sustainable health.<sup>10</sup> This approach, often termed "sustainable quality improvement" (SusQI), considers environmental, social, and financial impacts alongside traditional patient and population outcomes.<sup>10</sup> SusQI principles consider maximizing sustainable value by improving quality of care while simultaneously improving environmental, financial and social outcomes, rather than focusing on clinical outcomes alone. It allows students to apply sustainability concepts in real-world contexts,

improving care quality and also reducing the environmental footprint of healthcare services.<sup>10</sup>

Fostering medical student awareness of sustainability is crucial for their future responsible practice. Previous studies have indicated that a significant proportion of medical students had never encountered the concept of sustainable development prior to targeted educational interventions,<sup>2,5</sup> underscoring the urgent need for more comprehensive education on this topic in medical curricula. Consequently, understanding medical students' perceptions of sustainability education is vital for tailoring curricula to their needs and enhancing teaching effectiveness.

An internal document review of our curriculum identified a complete absence of sustainability-focused courses within the undergraduate medical program. This finding prompted this current investigation. Our five-year undergraduate program awards a Bachelor of Medicine and Surgery (MBBCh), which qualifies graduates to practice as general practitioners after completing the mandatory internship year. The curriculum exposes students to a variety of elective courses at four points during their five-year journey, including one in their final (fifth) year. These electives provide students with autonomy to explore their interests and engage with learning objectives beyond the mandatory core curriculum, allowing for in-depth study of chosen topics. Recognizing this deficiency in sustainability education, we were motivated to investigate student perceptions and design a novel course to introduce these essential concepts to our learners.

### **Theoretical background**

This study used a constructivist paradigm and relational ontology, where reality is constructed through social interaction. A constructivist epistemology approach was taken, viewing knowledge as instilled through learners' active participation, discovery, collaboration, and problem-solving. Social constructivism theory<sup>11</sup> served as the guiding theoretical framework for the course design, informing the following research questions:

- Are there measurable differences in project quality when comparing the work of

sustainability course participants with non-participants?

- How do learners perceive the sustainability course?

Social constructivism assumes that learning is socially constructed through interaction among learners within a supportive community. In this environment, students learn through engagement with the learning materials, the instructor, and their peers.<sup>11</sup>

### **Aim of the study**

This study aimed to evaluate the quality of sustainability projects developed by fifth-year medical students who completed an online sustainability elective compared with those developed by non-enrolled peers. Furthermore, the study sought to explore fifth-year medical students' perceptions of the sustainability course to gain valuable insights into their perspectives, learning preferences, and potential areas for improvement.

The findings from this research are intended to contribute to the growing body of knowledge on sustainability education in medicine and inform the development of effective curricula that empower future physicians to become advocates for both human and environmental health.

### **Methods**

#### **Study design**

A quasi experimental two-group design was adopted. A pretest on sustainability principles assessed baseline knowledge in both groups before enrollment, controlling for prior knowledge and ensuring groups were matched before the intervention. The pretest was in the form of 25 MCQS reflecting the learning objectives of the course. The post-test consisted of student projects, which were compared between the intervention group (course completers) and the control group (non-enrolled peers). Additionally, a cross-sectional survey was used to explore the perception of learners upon completion of the course.

#### **The educational intervention "the course design"**

A 14-day elective course was designed in January 2024 and offered to fifth-year medical students. The

course was online. The course objectives were prepared and announced to the learners beforehand during the selection process. The course consisted of two lectures and four tutorial sessions. The themes of the two lectures were: Introduction to Sustainability concepts; and The 17 Sustainable Development Goals (SDGs). The four tutorial's themes were: Do No Harm: the Green Technology; Sustainability Guide for Healthcare Facilities vs Higher Education Institutions; Facts and Fictions About Sustainability; Earth Day, Every Day: Sustainable Practices for Work and Home.

Tutorials included clinical or service-delivery examples (e.g., the environmental and health implications of hospital energy choices, water reuse, and waste management in clinical areas), so that students explicitly considered how sustainable practices can support safe, high-quality patient care (Appendix 1).

Lectures introduced core concepts of sustainability, the United Nations Sustainable Development Goals, and principles of sustainable quality improvement (SusQI). Tutorials used case-based activities to help students apply these concepts to institutional environmental challenges and to design SusQI-oriented project proposals. A dedicated WhatsApp group was used throughout the course to share materials, coordinate flexible session timings around clinical duties, and facilitate ongoing questions and peer discussion.

#### **Sampling**

Convenient sampling was used to recruit the study participants in both groups. A priori sample size was calculated using G Power version 3.1.9.7 (University of Düsseldorf) software considering population size of 2,000 students (fifth year medical students), medium effect size of (Cohen's  $d = 0.5$ ), alpha level of 0.05 and power of  $(1 - \beta = 0.95)$ . This effect size was chosen as it represents an educationally significant difference that would justify the implementation of the intervention. The minimum calculated sample size was 184 (92 in each group).

#### **The interventional group:**

Inclusion criteria:

- Fifth year medical students.

- Enrollment in "our path for a more sustainable future" elective course.

Exclusion criteria:

- Withdrawal from the course.
- Refusal to participate in the study.

### The control group:

Inclusion criteria:

- Fifth year medical students.
- Enrollment in any elective course **other than** "our path for a more sustainable future".

Exclusion criteria:

- Refusal to participate in the study.

### Participants

Three hundred and forty (340) fifth-year students enrolled in the "our path for a more sustainable future" elective course. They were enrolled in nine batches (batches 2–10). Two students did not complete the course and were excluded from the sample. Three hundred thirty-eight (338) completed the questionnaire and the required assignment. Additionally, 350 fifth-year students enrolled in other elective courses were invited to participate as control group. Of these, 331 students agreed to participate.

### Outcome measures

Students in both groups were required to develop a sustainability-focused solution addressing one environmental challenge at our institution. Challenges included shifting parts of the hospital to solar energy, recycling examination papers, and reusing rainwater or treated wastewater, with students required to articulate how each proposed solution could both reduce environmental impact and support safer, more resilient healthcare and learning environments. Student assignments, submitted before the end of the course, were coded and anonymized before being evaluated.

Projects were assessed for environmental impact, feasibility, creativity, stakeholder engagement and sustainability. The evaluation was conducted using rubrics developed based on the Rubrics for Green Competence Assessment (2022).<sup>17</sup> The rubric domains (environmental impact, feasibility, stakeholder engagement, and sustainability) were

operationalizations of SusQI principles.<sup>10</sup> Students were required to discuss how their proposed solutions could both reduce environmental harm and maintain or improve quality and safety of care. The two course instructors evaluated the projects' quality individually, then they discussed reaching a final decision. Inter-rater reliability for the categorical project ratings was substantial (Cohen's kappa = 0.76, 95% CI), indicating good agreement between the two assessors. Decisions were made according to the following scoring guidelines:

- **25–21 Points (Outstanding):** Solution is well-thought-out, highly feasible, and has a strong potential for lasting environmental impact.
- **20–16 Points (Proficient):** Solution meets most criteria effectively, with minor areas for improvement.
- **15–11 Points (Basic):** Solution shows a satisfactory understanding, but there are several areas needing refinement.
- **10–6 Points (Needs Improvement):** Solution requires significant development to meet the institution's needs.
- **5–0 Points (Unsatisfactory):** Solution does not adequately address the criteria.

### Data collection methods and tools

A 30-item questionnaire was developed based on a review of the relevant literature (12–16). The questionnaire was validated for content by a panel of 10 faculty members from Alexandria Faculty of Medicine with expertise in medical research. The content validity ratio (CVR) was calculated for each item<sup>18</sup> leading to the deletion of two items that did not meet the acceptable CVR threshold of 0.62. The final content validity index (CVI) was 0.8. A pilot study was conducted with 50 students from the first course batch (excluded from the main study), which confirmed the instrument's reliability. The final validated questionnaire consisted of 25 items across four sections: (1) demographic data and previous knowledge (3 items), (2) perspectives on sustainability (7 items), (3) perception of university sustainability practices (4 items), and (4) perception of the course's impact on knowledge (11 items) (Appendix 4). Items were rated on a 5-point Likert scale from 'strongly agree' to 'strongly disagree'. For analysis, responses collapsed into three categories: disagree, neutral, and agree. The questionnaire was

distributed online using the SurveyHeart application at the end of the course.

### Data analysis

Data was analyzed using IBM SPSS Statistics software Version 27.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (number, percentage, minimum, maximum, median, mean and standard deviation) were used to describe the results. Kolmogorov-Smirnov test of normality was used to check distribution of data. With regards to the inferential statistics, independent t-test was used to compare means, and Mann-Whitney test was used to compare the mean ranks.

## Results

### Demographics and baseline knowledge

The majority of participants were males in the sustainability course group and control group (52.4%, 50.6% respectively). About one third of learners in both groups were Egyptians (29.9%, 32.3% respectively). Age ranged from 21 to 30 years (mean=22.6 ±1, 24.0±1.7 respectively). There was no significant baseline difference in mean knowledge about sustainability between the two groups (p=0.1).

### Evaluation of students' sustainability projects

Two hundred-seven (61%) of projects in the sustainability group were evaluated as Outstanding or Proficient, compared with 35 (10.6%) projects in the control group. Two (0.6%) of projects in the intervention group were deemed Unsatisfactory compared with 141 (42.6%) in the control group. The sustainability course group showed statistically significant better median quality scores in the sustainability projects than the control group (p=0.01) with a large observed effect size (Cohen d=1.054).

### Learners' perception survey analysis

The post-course survey indicated that 67.5% of students did not know about the United Nations sustainability goals before enrolling in the course. Most students felt they would like more sustainability education (87.6%) and 75.4% indicated that they would reject high-paying positions at hospitals with poor environmental records.

Students were asked about university practices toward sustainability (Table 1). Only 27.9% of students in the sustainability course agreed that the university limits its negative impact on the environment and 39.3% agreed that the university involves students to help limit its negative impact on the environment.

Most students (97.6%) agreed that the course helped them to change their behavior and practices to save the environment. Additionally, 98.5% of students perceived that the course helped them understand the impact of sustainability on health and wellbeing.

## Discussion

This study demonstrates the significant positive impact of a dedicated elective course on both the perception and confidence of medical students on the topic of sustainability. The findings confirm that formal educational intervention can effectively equip future physicians with the knowledge and motivation to address environmental challenges in healthcare.

Our findings are consistent with previous work highlighting the need to integrate sustainability within medical curricula.<sup>19,20</sup> The high proportion of students (67.5%) who reported no prior knowledge of the Sustainable Development Goals reveals a substantive gap in their baseline education, and the post-course data indicate that this elective helped bridge that gap by improving their understanding of SDGs and their relevance to health and healthcare practice. The overwhelmingly positive student responses and increased motivation to learn more about sustainability post-course mirror the findings of Clery *et al.*,<sup>21</sup> who also reported enhanced learners' motivation following sustainability education. This can be explained by the concept that increasing awareness is a powerful driver of engagement, a principle noted by Stanford *et al.*<sup>2</sup> in UK-based programs. Furthermore, Krafft A. (2023) described that increasing awareness in education about climate change improved learners' engagement.<sup>22</sup>

Students' critical evaluation of our university's sustainability practices (55% perceiving a negative impact) is consistent with observations from other

**Table 1: Perception about university practices towards sustainability**

	Category	Number	percentage
Sustainability is addressed in other courses at my university.	Disagree	186	55
	Neutral	58	17.2
	Agree	94	27.9
	<b>Total</b>	<b>338</b>	<b>100</b>
The impact of climate change is addressed in other courses at my university.	Disagree	168	49.7
	Neutral	70	20.7
	Agree	100	29.6
	<b>Total</b>	<b>338</b>	<b>100</b>
My university limits its negative impact on the environment.	Disagree	186	55
	Neutral	58	17.2
	Agree	94	27.9
	<b>Total</b>	<b>338</b>	<b>100</b>
My university involves students in actions that limit its negative impact on the environment.	Disagree	145	42.9
	Neutral	58	17.8
	Agree	133	39.3
	<b>Total</b>	<b>338</b>	<b>100</b>

regions, such as the experience of Saudi students reported by Abubakar *et al.*<sup>23</sup> This recurring theme highlights a global opportunity for higher education institutions to seriously consider and strengthen their operational commitment to sustainability, which in turn can powerfully motivate students.

A particularly encouraging finding was that a considerable proportion of students (42.9%) reported feeling involved in the university's pro-environmental actions, suggesting higher perceived engagement in our context than the disengagement described by Abubakar *et al.*<sup>23</sup> This suggests that even modest efforts at involvement can be perceived positively. Furthermore, the strong disagreement (75.4%) with working in institutions with poor environmental records signals a values shift that could influence future employment markets, with staff favoring "green" healthcare

providers. This finding contrasts with earlier reports of student apathy.<sup>23</sup> This can be explained by the link between educational involvement and subsequent motivation to act.<sup>24</sup> At COP29 and COP30, there was a focus on learners' involvement and empowering youth as agents of change in decision-making. This could intensify the greening of communities and education for social transformation.<sup>25,26</sup>

The course was highly successful in improving students' understanding of core sustainability concepts, from SDGs to the direct links between environmental practices and health. However, students reported lower agreement on items exploring the links between sustainability and cultural diversity, human rights and social responsibility, suggesting that such social dimensions of sustainability were not emphasized

as strongly as the environmental aspects in the current course. This indicates a need for more focused content on the social dimensions of sustainability in future iterations, a challenge also noted in other programs where students felt key principles were not sufficiently emphasized.<sup>27</sup>

The superior quality of projects from the intervention group provides compelling evidence of the course's effectiveness in translating knowledge into actionable, high-quality solutions. This aligns with the outcomes of the MedInTo initiative, where students exposed to sustainability concepts developed more innovative and eco-friendly solutions to clinical problems.<sup>3</sup> The projects generated by our students from paper recycling and solar energy, to water harvesting and paperless systems, demonstrate a practical and critical understanding of institutional challenges and opportunities, offering a valuable roadmap for the institution itself. This can be explained through the concept that implementing projects addressing real problems facilitates knowledge dissemination and sustainable practices, demonstrating the impact of course engagement on students' perceptions.<sup>28</sup>

### Limitations

Despite its contributions, this study had limitations that should be acknowledged. Regarding the study

design, the quasi-experimental design lacked random assignment of participants to the intervention and control groups, as students self-enrolled in courses, which could have introduced selection bias. However, the relatively large sample size and the strong observed effect size could improve the generalizability of the study. With regards to the self-administered questionnaire, it might be susceptible to social desirability bias, while we ensured anonymity to mitigate this. Future research with a randomized controlled design, and multiple institutions that assess the behavioral shift of learners could increase the power of the study.

### Conclusion

Sustainability is an emerging competency in medical education. Our findings suggest that offering additional sustainability-focused courses and educational activities may further enhance students' awareness and motivation, which in turn could support more environmentally responsible practices in their future learning and ongoing professional contexts. Students experience more motivation to learn when engaged. Courses about sustainability could help medical students develop high-quality solutions to the environmental challenges they perceive. Evaluation of course content to improve any areas of weakness based on the learners' feedback is a must.

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Appendix 1: Intended learning outcomes

Competency area, the graduate as a	Module objectives	Lectures covering the objectives
<p><b>I. Scholar and scientist:</b></p> <p>1.11 Explain how learning predicts behavior change.</p>	<p>1.11.1 Explain the concept of sustainability and why it should be of such prime concern for all of us.</p> <p>1.11.2. Explain <i>the role</i> of Higher education institutions in <i>SDGs implementation</i>.</p> <p>1.11.3. Describe the term “<i>sustainable university</i>”.</p> <p>1.11.4. Identify <i>Areas that universities can target to be more sustainable</i>.</p>	<p><b>Lecture 1:</b> <i>Introduction to Sustainability concepts</i></p> <p><b>Tutorials 3:</b> <i>Sustainability Guide for Healthcare Facilities vs Higher education institutions</i></p>
<p><b>I. A professional:</b></p> <p>3.3 Exhibit appropriate professional behaviors and relationships in all aspects of practice, demonstrating honesty, integrity, commitment, compassion, and respect.</p> <p>3.4 Treat all patients equally, and avoid stigmatizing any category regardless of their social, cultural, ethnic backgrounds, or their disabilities.</p>	<p>3.3.1 Explain the importance of considering and satisfying <i>the need of the human factor</i> on sustainable development.</p> <p>3.3.2 Deduce the term <b>green technology</b> and <b>ecofriendly</b> and its relation to environmental sustainability.</p> <p>3.3.3 Identify the practices that healthcare organizations can adopt to support sustainability.</p> <p>3.4.1 Identify the aim of the SDGs and how they were created.</p> <p>3.4.2 Deduce how a prerequisite for sustainability development is the care for all patients equally.</p>	<p><b>Lecture 1:</b> <i>Introduction to Sustainability concepts.</i></p> <p><b>Tutorials 3:</b> <i>Sustainability Guide for Healthcare Facilities vs Higher education institution</i></p> <p><b>Lecture 2:</b> <i>The 17 Sustainable Development Goals (SDGs)</i></p> <p><b>Tutorials 3:</b> <i>Sustainability Guide for Healthcare Facilities vs</i></p>

<p>3.5 Critically analyze ethical issues commonly encountered in medical practice and formulate a framework within which such issues could be resolved.</p> <p>3.13 Demonstrate understanding of principles of health care quality improvement.</p>	<p>3.4.3 Describe what is meant by <b>social sustainability</b> and how it can be achieved.</p> <p>3.5.1 List different <b>challenges</b> face healthcare facilities to shift towards sustainable ways.</p> <p>3.5.2 Adhere to professional and ethical behavior towards all patients, demonstrating honesty, commitment, and respect.</p> <p>3.13.1 Describe the core meaning of quality and its value.</p> <p>3.13.2 Correlate how quality leads to sustainability and being a prerequisite for it.</p> <p>3.13.3 Enumerate the <b>four pillars of sustainable development</b>.</p> <p>3.13.4 Deduce the importance of achieving balance between the four pillars to reach sustainable development.</p>	<p><b>Higher education institutions</b></p> <p><b>Lecture 1: Introduction to Sustainability concepts</b></p> <p><b>Tutorials 3: Sustainability Guide for Healthcare Facilities vs Higher education institutions</b></p> <p><b>Lecture 1: Introduction to Sustainability concepts</b></p>
<p><b>7. A health promoter:</b></p> <p><b>4.10.</b> Demonstrate Basic Understanding of Health Promotion Program Planning.</p> <p><b>4.11.</b> Plan a Health Promotion Program.</p>	<p>4.10.1 Describe what is meant by “Envision 2030” and 2030 Agenda for Sustainable Development.</p> <p>4.10.2 Mention <b>the main scope of each SDG</b> and its <b>underlying targets</b>.</p> <p>4.11.2 Describe <b>Egypt Vision 2030 and its relation to the global</b></p>	<p><b>Lecture 2: The 17 Sustainable Development Goals (SDGs)</b></p>

<p><b>4.12.</b> Advocate access to healthcare for members of traditionally underserved populations.</p> <p><b>4.13.</b> Empower communities, by raising their awareness and building their capacity</p>	<p><b>goals &amp; 2030 agenda for sustainable development.</b></p> <p>4.11.2 Identify the term "<b>Egyptian Government Excellence Award</b>" and its relation to Egypt vision 2030.</p> <p>4.12.1 Explain the term "<b>leaving no one behind</b>" as an approach to achieve sustainable development for all.</p> <p>4.13.1 Recognize their responsibilities toward the community, by raising their awareness and leading by example.</p> <p>4.13.2 Plan how to spread the awareness of "<b>the sustainability development and go green principle.</b>"</p> <p>4.13.3 Execute his role as educator towards the community, having positive impact on the society.</p>	<p><b><u>Tutorials 4:</u></b> <b><i>Earth Day, Every Day: Sustainable Practices for Work and Home.</i></b></p>
<p><b><u>A member of the health team and a part of the health care system</u></b></p> <p><b>5.4</b> Respect other health care professionals and work cooperatively with them for effective patient management.</p>	<p>5.4.1 Recognize the important role of other health care professionals and the need for collaborative work for best practice.</p> <p>5.7.1 Identify the importance of sharing <b>durable assets such as</b> transportation, buildings,</p>	<p><b><u>Tutorials 2:</u></b> <b><i>Sustainability Guide for Healthcare Facilities vs Higher education institutions</i></b></p> <p><b><u>Tutorials 2:</u></b></p>

<p><b>5.7</b> Be willing to share in all types of inter-professional activities including collaborative and shared learning.</p> <p><b>5.13</b> Recognize the importance of applying fundamental knowledge of health economics to ensure the efficiency &amp; effectiveness of the health care system.</p>	<p>equipment, that make all operations more environmentally sustainable.</p> <p>5.13.1 Identify the importance of economic sustainability and how can be reached.</p> <p>5.13.2 Define the term green technology.</p> <p>5.13.3 Enumerate different types and classification of sustainable technology.</p> <p>5.13.4 Identify the advantages and disadvantages of each type of technology.</p> <p>5.13.5 Recommend what technologies are easy to apply and substitute regular technology.</p> <p>5.13.6 Deduce <i>how conservation of resources</i> can reduce costs and ensure the <i>efficiency &amp; effectiveness of the health care system</i>.</p> <p>5.13.7 Differentiate between true and false facts regarding sustainability.</p> <p>5.13.8 Discuss how sustainability can be achieved by affordable solutions and practice.</p> <p>5.13.9 Identify wrong practices with high energy consumption and waste production.</p>	<p><b><i>Sustainability Guide for Healthcare Facilities vs Higher education institutions</i></b></p> <p><b><u>Lecture 1:</u></b> <b><i>Introduction to Sustainability concepts.</i></b></p> <p><b><u>Tutorial 1:</u></b> <b><i>Do no harm: the green technology.</i></b></p> <p><b><u>Tutorials 2:</u></b> <b><i>Sustainability Guide for Healthcare Facilities vs Higher education institutions.</i></b></p> <p><b><u>Tutorials 3:</u></b> <b><i>Facts and fictions about sustainability.</i></b></p>
<p><b><u>A lifelong learner and researcher:</u></b></p> <p>6.3 Regularly reflect on and assess his/her performance using</p>	<p>6.3.1 Present information clearly in written, electronic, and oral forms.</p>	<p><b><u>Tutorials 4:</u></b></p>

<p>various performance indicators and information sources.</p> <p>6.7 Recognize practice uncertainty and knowledge gaps in clinical and other professional encounters and generate focused questions that address them.</p>	<p>6.3.2 Demonstrate an effective use of online search engines, information technology and computers in storing and retrieving information.</p> <p>6.3.3 Write down <b>one-page reflective journal</b> on key learning moments from Week 1 in the course, how it helped him on personal and professional levels.</p> <p><b>6.7.1 Discuss ideas and arguments effectively</b> with colleagues and course instructor.</p> <p>6.7.2 Use new <b>green habits</b> instead of old regular ones in everyday practice.</p>	<p><i>Earth Day, Every Day: Sustainable Practices for Work and Home</i></p> <p><b><u>Tutorials 4:</u></b> <i>Earth Day, Every Day: Sustainable Practices for Work and Home</i></p>
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