The Report on Local Industry Needs and Knowledge Gap Specification in Ghana and Namibia

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Introduction

The primary objective of this consolidated report, ***The Report on Local Industry Needs and Knowledge Gap Specification in Ghana and Namibia***, is to identify the current and emerging needs of local industries and to assess the knowledge gaps within partner Higher Education Institutions (HEIs) in Ghana and Namibia. These findings provide a critical foundation for aligning educational programs with labour market demands, particularly in the context of the green and digital transitions—collectively referred to as the twin transition.

The Report on Local Industry Needs and Knowledge Gap Specification in Ghana and Namibia is part of Deliverable D2.1 within the TeProD project: Improving Teachers and Students' Professional Development with Twin Transition in Sub-Saharan Africa (Grant Agreement № 101177880 — ERASMUS-EDU-2024-CBHE).

The methodology applied across all participating institutions was based on a structured self-assessment framework, developed under the leadership of the Technical University of Košice, Slovakia, in close collaboration with all project partners. This framework guided the assessment process at each institution, ensuring consistency and comparability across diverse educational and institutional contexts.

The assessment covered four key stakeholder groups: university management, academic staff, students, and local industry representatives. The investigation focused on three interrelated dimensions:

- **Going Green** – assessing readiness for integrating sustainability, circular economy principles, and green competencies into teaching, research, and operations;
- **Going Digital** – evaluating preparedness to adopt digital technologies, enhance digital literacy, and apply innovative tools such as artificial intelligence in education;
- **Going Twin** – exploring how HEIs can strategically integrate both green and digital transitions into a coherent institutional development path.

The survey was conducted between January and March 2025. Altogether, 62 university management representatives, 229 teachers, 1,389 students, and 35 local industry representatives participated, resulting in a total of 1,715 respondents.

This report presents findings from three institutional reports:

- University of Ghana (UG) in Ghana
- University of Education, Winneba (UEW) in Ghana,
- International University of Management (IUM) in Namibia.

Through analysis of the strengths, weaknesses, and opportunities of each institution, the report identifies strategic areas for intervention and capacity building. These insights will directly inform the design of updated curricula, teacher training materials, and collaborative activities within other Work Packages of the TeProD project.

We hope this report will also serve as a useful reference for higher education institutions beyond the TeProD consortium. It includes a replicable methodology annex that can be adapted by other HEIs interested in assessing their preparedness for the green, digital or twin transitions. By sharing our process and findings openly, we aim to support broader efforts to build resilient, future-ready education systems across Sub-Saharan Africa and beyond.

On behalf of the team of authors,

Natasa Urbančíková
Editor
Technical University of Košice, Slovakia

Key Synthesis of Findings

The analysis of survey responses collected from the University of Ghana (UG), the University of Education, Winneba (UEW), and the International University of Management (IUM) reveals several common trends and challenges across institutions in Ghana and Namibia. Below is a synthesis of the key findings across all four stakeholder groups—university management, academic staff, students, and local industry representatives. This synthesis is followed by detailed institutional reports for each HEI, providing in-depth insights and context-specific observations.

1. Preparedness for the Green Transition

- All institutions demonstrated a basic awareness of sustainability concepts; however, implementation remains limited and uneven.
- University management acknowledged the strategic importance of the green transition but noted a lack of integration into curricula and insufficient allocation of dedicated resources.
- Faculty responses indicated moderate engagement with sustainability topics, though many expressed a need for further training—particularly in technical areas such as renewable energy and the circular economy.
- Students across all institutions showed a strong interest in green issues but reported limited practical exposure and few clear career pathways in green sectors.
- Employers consistently expressed low satisfaction with graduates' green competencies, emphasizing the need for better curriculum-industry alignment.

2. Preparedness for the Digital Transition

- Digital readiness was generally more advanced than green readiness, and a broader adoption of digital tools and blended learning platforms was reported.
- Faculty and students demonstrated increasing familiarity with digital technologies, although challenges persist—especially regarding infrastructure, training, and the effective implementation of digital strategies.

3. Twin Transition Readiness

- While each institution is making progress in green and digital areas independently, there is limited evidence of integrated twin transition strategies.
- Key gaps identified across all three institutions include a lack of cross-disciplinary collaboration, formal monitoring mechanisms, and systematic stakeholder engagement in twin transition initiatives.
- Both students and faculty highlighted the need for more interdisciplinary, project-based learning and industry collaboration to build relevant twin transition competencies.

1 The Report on Local Industry Needs and the Knowledge Gap Specification of the University of Ghana, Ghana

1.1 University at a Glance

The University of Ghana (hereafter refer to as 'The university') is the premier university in Ghana and was established on August 11, 1948. The university is governed by a Council and headed by the Chancellor, however the Vice Chancellor, assisted by two Pro Vice Chancellors, is in charge of daily administration of the university. The organizational structure of the University is shown in Fig. 1

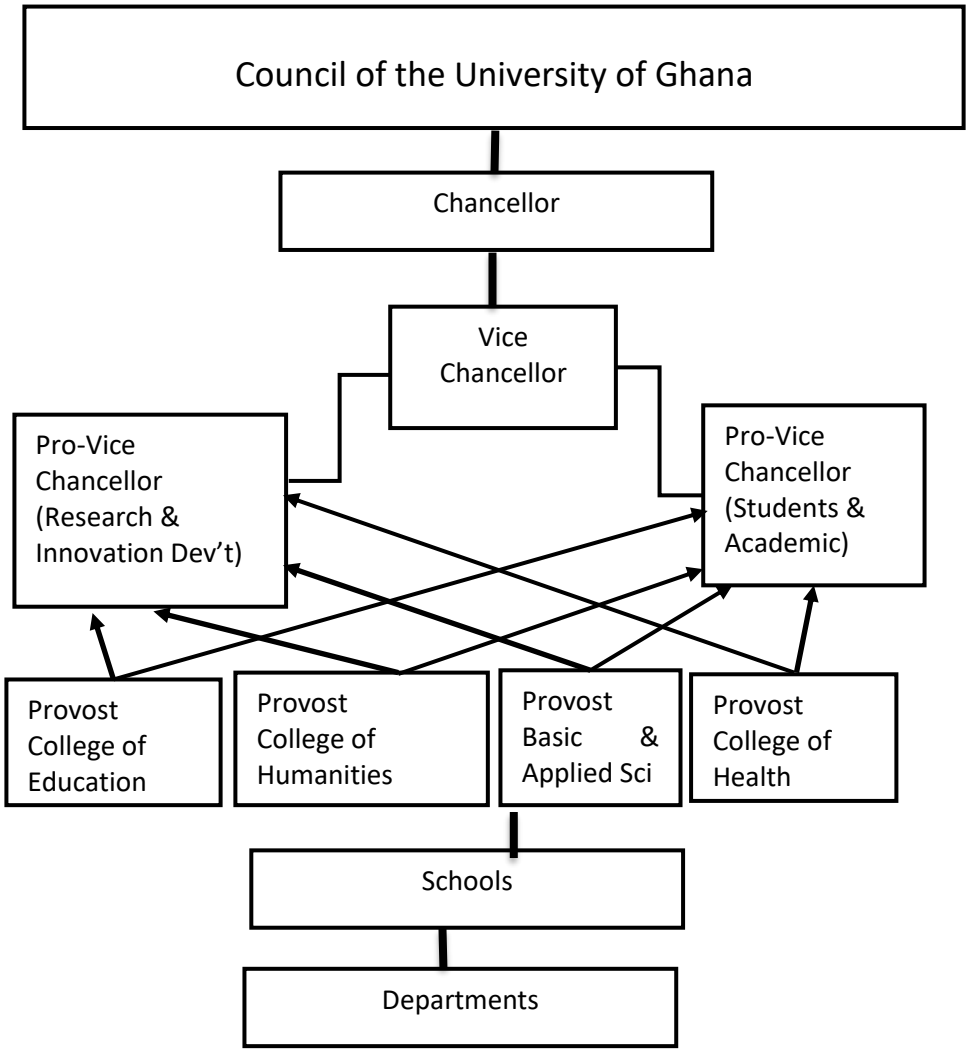


Figure 1: The organizational structure of the University of Ghana

It is the largest university in Ghana and operates through four main colleges namely: The Colleges of Humanities, Basic and Applied Sciences, Education, and Health Sciences. Each college comprises multiple departments which are organized under Schools. Teaching, learning and research is done at the departments and in specialized research centers. The table below categorizes the academic institutions.

COLLEGE	SCHOOLS
Humanities	School of Law School of Arts School of Languages School of Social Sciences, School of Performing Arts. University of Ghana Business School (UGBS)
Basic and Applied Sciences	School of Physical and Mathematical Sciences School of Biological Sciences School of Agriculture School of Veterinary Medicine, and School of Engineering Sciences.
Education	School of Information and Communication Studies School of Education and Leadership, and School of Continuing and Distance Education.
Health Sciences	The University of Ghana Medical School University of Ghana Dental School School of Public Health School of Nursing and Midwifery School of Pharmacy, and The School of Biomedical and Allied Health Sciences

Annex 3 shows a detailed table of the schools and their respective departments.

According to the 2023/2024 university statistics, there are a total of 6,565 employees including both academic and administrative personnel. The academic faculty, constitutes 2,108 individuals, representing 32% of the staff population whiles non-academic staff are 4,457 representing 68%. The University, by the record, has a total student enrolment of 73,155. This includes 60,837 undergraduates, 8,063 graduate students, 2,809 non-degree students, and 1,446 PhD candidates. International students make up approximately 1% of the student body. Additionally, students with special needs represent 0.4% of the total enrolment. Since its establishment, the University has produced an alumni network exceeding 400,000 individuals, many of whom have attained national and international prominence. Figure 1 below sites Ghana in the African continent.

Figure 2: Geographical location of Ghana (arrowed).

The University is geographically situated in Legon near Accra, the capital city. Accra also serves as a key political and economic centre of the nation. The University plays numerous and crucial roles in the local economy through industry collaborations, research initiatives, and community engagement. The university actively contributes to addressing national issues such as climate change, youth unemployment through project initiatives and partnerships with international organizations such as EU, UNICEF, among others. The university is a green and sustainability conscious body. For instance, the solar panels are increasing being installed for green energy in new buildings whilst the streetlights are replaced with low power LED types. Tree plantation is a continuous process. Also, collection points for plastic bottles for recycling are located mostly near lecture and library areas.

Consistently ranked among the top universities on the continent, the university secured the 5th position in the 2024 Times Higher Education Sub-Saharan Africa University Rankings. It was also ranked 1st in both Ghana and West Africa, with an overall score of 74.3. The institution has received notable recognition for its contributions to sustainable development and research excellence.

The University has established several research centres across the humanities, health sciences, education, and applied sciences. The university's main research areas are:

- Food production and processing with emphasis on improved approaches to breeding,
- Trans-disciplinary research into climate change adaptation
- Development policy, poverty monitoring, and evaluation
- Politics, socio-cultural change, mobility, and development
- Creative arts, education, communication, and information literacy and
- Fourth Industrial Revolution tools such as artificial intelligence, data science, machine learning, and digital transformation.

The university collaborates with over 100 institutions globally: Welcome Trust, The Pan-African Doctoral Academy (PADA) & Building a New Generation of Academics in Africa (BANGA-Africa) project, World bank, European Union (EU), Danish International Development Agency (DANIDA), The Ecodesign for Sustainable Products Regulation (EPSR), French Academy, Oxford University, Cambridge, Stanford, Leeds, International University of Management (IUM), among others. The university is committed to becoming a globally impactful institution through innovative research, quality teaching, and community engagement. Its mission, vision, and strategic goals are designed to guide its development over the next five years (2024–2029). The university's new strategic plan is anchored on five key pillars Transformative Student Experience, Impactful Research, Commitment to Our Faculty and Staff, Engagement and Partnerships, and Sustainable Resource Mobilization and Stewardship.

1.2 University Management and Organisation

With a staff strength of approximately 6,565 including both academic and administrative personnel, the university maintains a diverse workforce. In terms of gender distribution, the total staff includes 4,508 males (68.67%) and 2,057 females (31.33%). As a public institution, the University operates under government oversight and adheres to national policies governing higher education.

The university maintains rigorous quality assurance standards and is certified by the Ghana Tertiary Education Commission, which regulates, supervises, and accredits tertiary institutions in Ghana. The university is also a member of several international organizations, including the International Association of Universities, the Association of Commonwealth Universities, the Association of African Universities, and the African Research Universities Alliance. Furthermore, the University has obtained international accreditation from the Agency for Quality Assurance through Accreditation of Study Programs, a non-profit organization based in Germany.

To ensure academic excellence, the university has established the Academic Quality Assurance Directorate (AQAD), which oversees academic standards across all units and

affiliated institutions. Importantly, the AQAD reviews the curricula for new programmes and courses for compliance with set standards. The AQAD on a continuous basis, conducts course and lecturer evaluations, and provides feedback on the lecturers' delivery from the students' perspective for development. The AQAD is responsible for ensuring periodic re-accreditation of programmes and also facilitates staff development initiatives.

In relation to digital governance, the Information Technology Directorate (ITD) oversees the University's ICT infrastructure and leads its digital transformation agenda. This includes implementing policies related to data security, digital records management, and the automation of administrative and academic processes such as the Management Information System (MIS) Web and Learning Management System (LMS) codenamed the Sakai platform. All employee and student (academic) records are available on the MIS. For example, the University does not supply hard copy salary slips any more to any employee and all students have access to their academic records and learning material electronically. The ITD also facilitates online examinations for very large groups in their computer labs. Digital administration applies to the University Health service delivery system.

The University of Ghana places a strong emphasis on continuous professional development for its staff. Regular training programs cover wide areas such as:

- best practices at work,
- teaching and pedagogical methodologies,
- research skills,
- career and leadership training,
- quality assurance, and international collaboration
- Microsoft Teams and OneDrive to enhance digital skills.
- leadership development.

There are, however, currently no specialized training programs dedicated to the green transition, but training for the digital transition enhancing digital competencies abound.

1.3 Education

The university boasts a diverse student population including international students. The International Programmes Office facilitates student exchange programs with 107 partner institutions in over 36 countries. The gender distribution among the 73,155 students (2023/24 records) is nearly equal, with males accounting for 36,525 (49.9%) and females for 36,630 (50.1%) of the total student body. The university offers 253 accredited study programs across various disciplines, including over 10 graduate and 3 undergraduate programs directly aligned with green and digital transitions. Post-Covid-19, the University launched the Integrated Online Learning Program (IOLP) in collaboration with international partners such as Alison, Leyden Educational Foundation, and SOLNetwork, offering over 3,000 free certificated courses to support virtual learning. Additionally, UG partnered with Huawei Ghana to introduce a free online 5G course, equipping students with foundational knowledge in advanced digital technologies.

In response to the COVID-19 pandemic, the university transitioned to a blended learning approach, integrating online and in-person instruction while platforms like Sakai LMS and MIS Web support content delivery and student engagement. Aligned with sustainability and digital transformation, UG has implemented initiatives such as the Waste-to-Fuel Project by the Institute of Applied Science and Technology, which tackles plastic pollution through sustainable development solutions. The university also actively engages youth in climate action programs, promoting digital skills for environmental sustainability, thereby supporting Ghana's Green Plastic Circular Economy goals and contributing to global sustainability efforts.

1.4 Data collection

To better understand the current landscape and challenges of leveraging digital technologies for the Green Deal in Sub-Saharan Africa (SSA), TeProD conducted a survey across all partner universities, including the University of Ghana. In addition to the survey, interviews were organized for industry stakeholders. Three set of questionnaires were developed for each partner to collect data. Each set of the questionnaires targeted one from the following categories: HEI Management, Teachers and students.

For the University of Ghana, the table below shows the data on which this report is based. The number of responses from each category and the target number is also indicated.

Respondent category	Target sample	Response rate	
Institution	26	19	73%
Teachers	100	109	109%
Students	200	883	442%
Local Industries	10	10	100%

1.5 GOING GREEN: Supporting Sustainable Goals

This section presents findings on the current state of Twin Transition (Digital and Green Deal) knowledge at the University of Ghana. The analysis covers four key stakeholder groups from which data were collected: university management, students, faculty members, and industry partners through self-assessment.

1.5.1 University Management Self-Assessment Findings

- The data reveals that the University of Ghana has shown commitment to integrating sustainability into its operations and curricula.
- Significant gaps remain though as expressed by management, teachers, students. and employers.

The majority of management agreed that the University of Ghana is incorporating green practices into its operations. However, the results as summarized in the chart Figure 3 shows a significant number of the school management remained neutral, suggesting uncertainty or

limited awareness about the extent of the university's green transition efforts. While there is evident support at the management level for sustainability, the presence of many neutral responses points to a communication gap or lack of clarity about ongoing efforts. It also indicates the need for clearer policies and strategies, and more visible implementation of green initiatives. Challenges such as lack of funding, limited infrastructure, insufficient training, and unreliable internet access are significant barriers to progress.

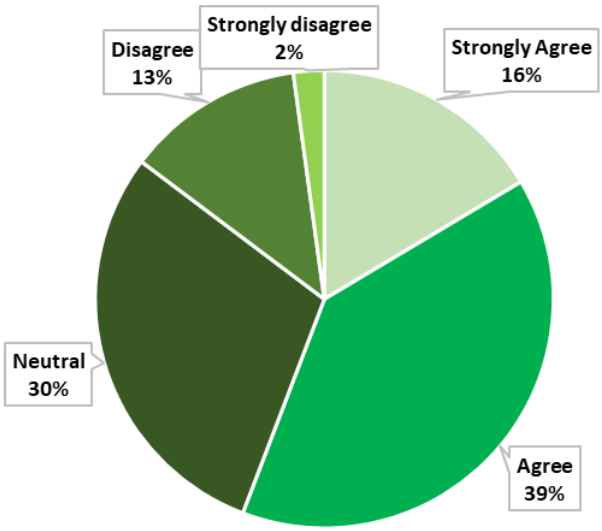


Figure 3: Summary of the extent to which the Institution perceives itself to implement the Green Deal.

1.5.2 Teacher Self-Assessment Findings

As indicated in Figure 4, majority of HEI teachers at the university are somewhat familiar with sustainability and environmental responsibility. Some have already applied environmentally conscious teaching strategies (e.g., paperless teaching, using energy-efficient labs). However, their understanding of key green concepts such as climate change, renewable energy, biodiversity, and circular economy is moderate rather than deep or comprehensive.

A nearly equal number of teachers (39 each) reported being either moderately or very confident in teaching sustainability-related content. However, many only occasionally assign student projects that focus on environmental impacts or green solutions. This indicates a growing awareness among teachers but also reveals gaps in in-depth knowledge and teaching practice. The limited frequency of sustainability-focused assignments suggests that green concepts have not been fully embedded in pedagogical strategies. Challenges such as lack of training, insufficient curriculum time, limited teaching materials, and low student interest continue to limit effective integration. However, opportunities exist in the form of training access, institutional support, resource development, and collaboration with peers and external partners.

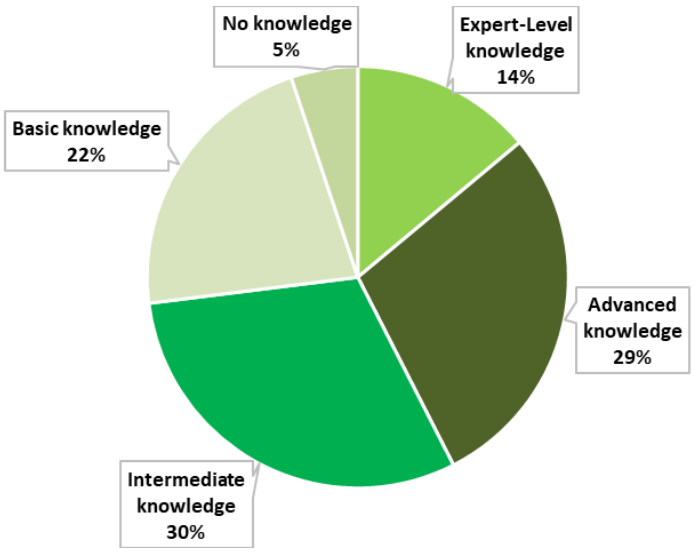


Figure 4: Summary of the teachers' self-assessed understanding and practice of key areas in green deal.

1.5.3 Student Self-Assessment Findings

Students assessed their understanding and skills in various key green concepts and practices. The responses were largely neutral across board. Students were asked about their ability to:

1. Understand the interconnection between environmental, social, and economic systems
2. Analyze environmental challenges and suggest practical solutions
3. Make eco-friendly personal choices
4. Understand circular economy principles
5. Know the causes and consequences of climate change
6. Collaborate on sustainability goals
7. Evaluate sustainability-related policies
8. Advocate for sustainability in different settings
9. Feel prepared to contribute to global sustainability goals

As indicated in Figure 5, the neutral responses suggest limited confidence and possibly insufficient exposure to sustainability education. It shows that students may not be receiving adequate training or encouragement to apply green thinking in both academic and personal contexts. This gap implies that more needs to be done to embed sustainability in the curriculum and co-curricular activities to prepare students for the realities of a green economy and society.

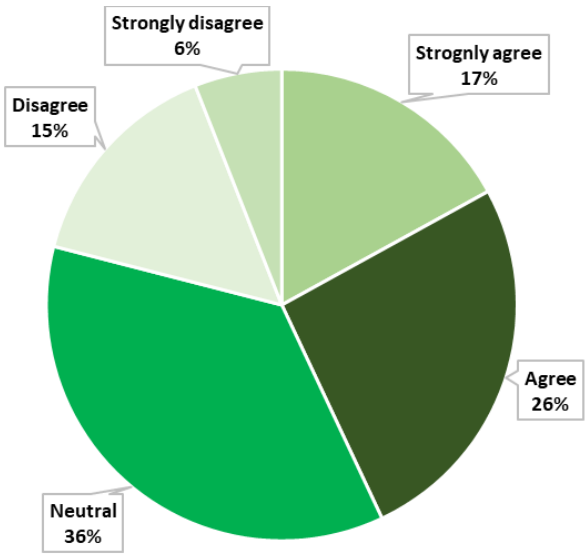


Figure 5: Summary of the students' self-assessed understanding of and skills in key areas in green deal.

1.5.4 Findings from the industry

Employers acknowledge that graduates are generally aware of the concepts of green and digital transitions, largely due to widespread public discussions. However, only 20% of graduates show a clear and practical understanding of sustainability. In many cases, environmentally friendly behaviors like using reusable bottles are driven more by social trends than environmental awareness. Some sectors recognize the value of green skills but do not consider them critical for hiring. Moreover, sustainability responsibilities are typically left to the organization rather than owned by individual employees. There is a gap between graduate awareness and practical application of green skills in the workplace. This suggests the need for universities to produce graduates who are not just aware of sustainability concepts, but who can also apply them meaningfully across various industries.

Summary of Findings

The findings reveal that although the University of Ghana has shown initial commitment to integrating sustainability into its operations and curricula, significant gaps remain across all stakeholder levels that is, management, teachers, students, and employers.

- Management supports the green agenda, but many remain unsure about the university's actual readiness, indicating a gap between intention and visible action.
- Teachers are somewhat familiar with sustainability concepts and practices but lack deep knowledge and structured support to fully embed them in teaching.
- Students, meanwhile, demonstrate limited confidence and neutral responses across key sustainability competencies, suggesting inadequate exposure and practical engagement.

- Employers, though recognizing green awareness, currently prioritize digital skills over sustainability, and often view sustainability as an organizational, not individual, responsibility.

This means that while awareness is growing, practical implementation is still fragmented. For the university to lead in the green transition, it must move from passive support to active, coordinated leadership through stronger strategic planning, faculty development, curriculum integration, student engagement, and alignment with future labour market demands to transform sustainability from concept to practice across the academic system.

Strategic Action to improve Twin transition education in the next 3years

1. Increase budget to alleviate financial constraints to the expansion and execution of green sustainability initiatives.
2. Expand on Infrastructure
3. Invest on IT soft resources and infrastructure.
4. Increase support in technological HR, e.g frequent training sessions on content.

Recommendations for improving Twin transition

1. Develop and implement a comprehensive sustainability strategy
2. Build capacity through training and awareness programs
3. Embed sustainability across the curriculum
4. Invest in green infrastructure systems
5. Strengthen partnerships with industry stakeholders

1.6 GOING DIGITAL: Embracing Technology for Innovation

1.6.1 University Management Self-Assessment Findings

- The University of Ghana has invested a lot on digitalization and the institution agrees that it is adopting digital tools and technologies in all its management and educational training practices.
- A significant number of teachers admit that they do not use enough digital tools available in teaching although they are well aware of and apply the LMS and conferencing tools in the system for teaching and collaboration.
- Apart from a significant portion of neutrals, the majority of students agree or strongly so that they actively use the digital tools for research, communication and collaboration.
- Industry does not offer on-the-job enhancement training but expects universities to impart more digital skills to graduates.

Results of the survey showed that the university's management shows strong agreement that the university is adopting digital tools and technologies in education and administration. Compared to the green transition, there is a more decisive level of agreement. However, a notable number of respondents still selected "neutral," indicating that most is not fully informed or engaged. This suggests that while the institution is on the right track toward digital transformation, there is still room for improvement in communication and involvement across all levels of management. A more inclusive and transparent digital strategy could help eliminate ambiguity and enhance buy-in across departments.

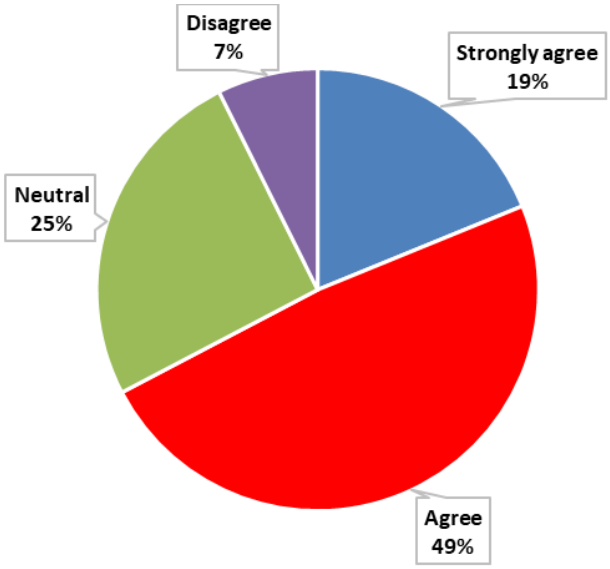


Figure 6: Summary of the extent to which the Institution agrees or not that it is undergoing the digital transition.

1.6.2 Teacher Self-Assessment Findings relating to digitalization

A majority of teachers are either very familiar or somewhat familiar with digital tools. 47 teachers understand digital transformation well, while 41 have only a basic understanding. Only 17 can explain it in-depth and give real-world examples. 53 teachers regularly use digital tools like Learning Management Systems (LMS), collaboration software, and video conferencing platforms. Many have advanced knowledge of:

- LMS platforms (e.g., Moodle, Canvas)
- Digital assessments (e.g., Google Forms, Kahoot)
- Online and blended learning
- Cybersecurity and data privacy
- AI in education
- Communication tools (e.g., Zoom, Teams)

However, AI tools are rarely used for tasks like personalized learning, grading, tutoring, content creation, or classroom management except in research contexts. Challenges such as lack of training, insufficient curriculum time, limited teaching materials, and low student interest continue to limit effective integration. This means that teachers are generally well-versed in the basics and some advanced aspects of digital education but lack practical engagement with AI and emerging technologies. This indicates a gap between awareness and implementation. With proper training and exposure, teachers could adopt AI and automation tools to enhance teaching and administrative efficiency.

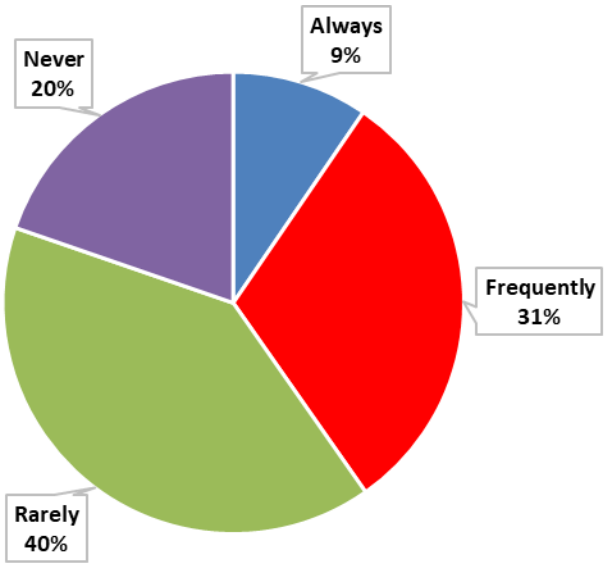


Figure 7: Teachers' self-assessment on the extent of their use of digital tools in teaching, collaboration and engagement.

1.6.3 Student Self-Assessment Findings relating to digitalization

Students evaluated their digital competencies across a wide range of skills. The responses suggest that students are moderately confident in:

- Searching, evaluating, and using digital information
- Communicating and collaborating using digital tools
- Creating and sharing content ethically
- Understanding cybersecurity and protecting digital identities
- Troubleshooting technical problems
- Understanding AI, data analytics, and their uses
- Using digital tools for sustainability and innovation
- Staying current with new technologies

This means that students have some awareness of digital competencies but may need more structured learning opportunities to gain deeper and broader competencies especially in AI, data use, and sustainable tech applications. Encouraging innovation projects and more digital hands-on assignments would further build their confidence and skillset.

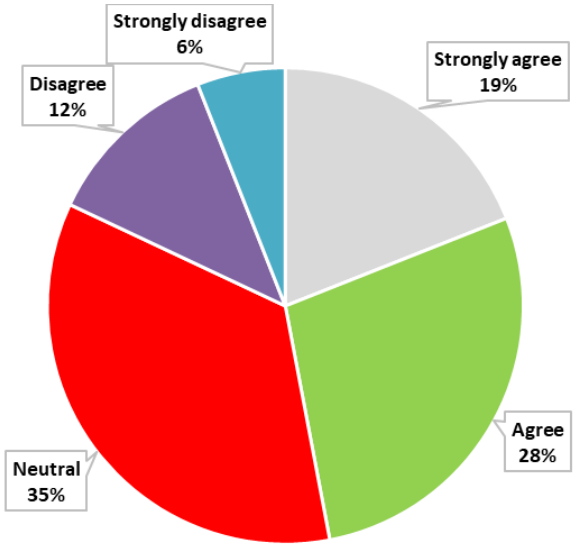


Figure 8: Students' self-assessment on their digital skills such as communication, research, and in collaboration.

1.6.4 Findings from Industry

All employers expect graduates to have basic digital literacy. Commonly required skills include: Proficiency in Microsoft Office and industry-specific tools and ability to adapt and learn new software quickly**.** Although AI knowledge is emerging as a desired competency, it is not yet a standard hiring requirement. Employers value graduates who demonstrate adaptability and a willingness to learn. The results suggest that graduates are entering the workforce with only foundational digital knowledge and are expected to upskill on the job. This places the responsibility on higher education institutions to not just prepare students with the basics but also to expose them to practical, job-relevant digital tools and thinking especially as industries evolve toward automation and AI integration.

Summary of findings

The university is making notable progress in adopting digital tools and technologies across its educational and operational systems.

- Management largely agrees that the university is on the right path with digital transformation, showing stronger consensus than in the green transition.

- Teachers demonstrate solid familiarity with digital platforms such as Learning Management Systems, online assessments, and communication tools. While many possess advanced knowledge in areas like blended learning and cybersecurity, there is limited use of AI in teaching practices except for research purposes. This highlights a gap between theoretical understanding and practical application, influenced by barriers such as lack of training, limited time, inadequate resources, and student disinterest. Students expressed moderate confidence in their digital abilities but remained largely neutral when evaluating their competence in specific areas such as AI, data analytics, cybersecurity, and digital collaboration. This suggests limited hands-on exposure and a need for more structured, practice-based digital learning. Most students are aware of the importance of digital skills but do not feel fully prepared to apply them in real-world settings or contribute effectively to digital and green transitions.
- Employers confirm that graduates generally possess basic digital literacy such as proficiency in Microsoft Office and adaptability to new software but lack deeper, job-ready skills. While AI and automation are becoming more relevant, they are not yet widespread hiring requirements. However, employers value graduates who show a willingness to learn and evolve with technological advancements.

In conclusion, while UG is making strides in digital integration, a significant implementation gap persists. To fully realize its digital transformation goals, the university must invest in training, enhance curriculum relevance, promote experiential learning, and forge stronger connections between academic preparation and the evolving digital demands of the workplace.

Strategic Action to improve Twin transition education in the next 3years

1. Provide continuous digital skills training for academic and administrative staff, focusing on modern teaching tools, AI applications, and online learning methods.
2. Revise academic curricula to embed essential digital competencies (e.g., data literacy, cybersecurity, digital collaboration) in all programmes.
3. Upgrade digital infrastructure by expanding high-speed internet access, investing in smart classrooms, and enhancing LMS platforms like Moodle or Canvas.

Recommendations for improving Twin transition

1. Strengthen Digital Pedagogy Training for Staff
2. Integrate Digital Competencies Across All Programmes
3. Invest in Robust IT Infrastructure and Technical Support
4. Promote Experiential Digital Learning for Students
5. Enhance Industry Collaboration for Digital Skill Alignment

1.7 TWIN TRANSITION: Integrating Digital and Green for Future Education

1.7.1 University Management Self-Assessment Findings

- The extent to which the Institution incorporates twin transition into its vision was uncertain, attracting neutral responses from about half of respondents.
- A majority of teachers admitted to rarely or never engaging students in projects relating to twin transition.
- Students' knowledge on the interrelationship between digital and sustainable practices on the environment was low.
- In industries, digital skills continue to take precedence over green initiatives, due perhaps to the direct effect digital skills on production. Awareness of how these impact the environment was quite low in the industry.

The evaluation explored six key areas: Institutional Strategy and Leadership, Curriculum and Education, Research and Innovation, Operations and Campus Infrastructure, Collaboration and Stakeholder Engagement, and Monitoring and Evaluation. The findings revealed that a majority of university management respondents remained neutral regarding the extent to which the twin transition has been incorporated into the university's activities. This neutrality reflects a general lack of awareness or uncertainty about the institution's direction in this area. Notably, the concept of twin transition has not yet been clearly defined, communicated, or embedded within the university's strategic documents or decision-making structures.

Challenges include low awareness of the twin transition even among senior administrators and governance leaders, a lack of formal strategy or policy that brings together green and digital transformation, and minimal communication or institutional engagement around the concept. In some cases, respondents indicated no understanding of the term at all, highlighting a significant gap in internal awareness. The integration of digital and green strategies is currently fragmented, lacking strategic coordination across departments and functions.

To address these gaps, the university must begin by developing a formal policy or strategy that clearly outlines how green and digital goals will be integrated. It is also essential to allocate targeted funding for initiatives that combine both digital and sustainability objectives. Furthermore, implementing institution-wide training programs will help raise awareness and build capacity among faculty, staff, and students. Improved communication and coordination across departments will ensure a shared understanding and collective action. Establishing partnerships with technology firms and sustainability-focused organizations can provide practical support and innovation pathways. Additionally, adopting paperless operations across all units can help further align digital and environmental goals in a tangible and measurable way.

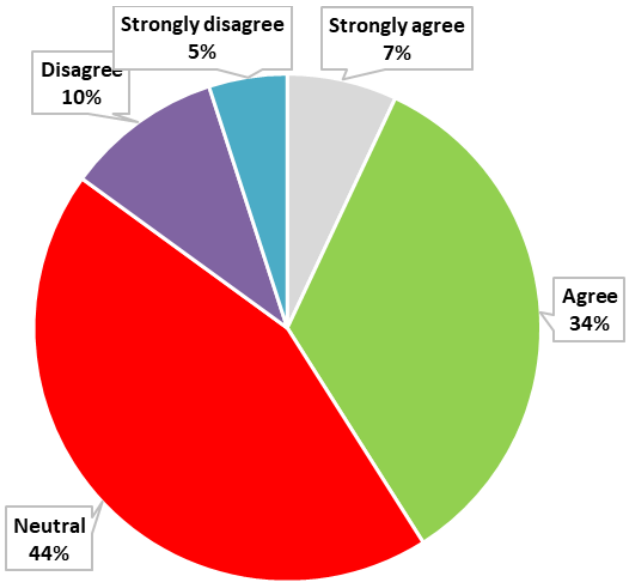


Figure 9: The Institution's self-assessment on the extent to which it agrees with the twin transition being assimilated.

1.7.2 Teacher Self-Assessment Findings

Among HEI teachers at the University of Ghana, there is a growing awareness of the interconnection between digital and green transformations, although their understanding of the twin transition remains incomplete. Many respondents indicated they were only somewhat familiar with the concept, and a significant portion had only partial familiarity. Most teachers reported moderate confidence in their ability to teach or incorporate the twin transition into their practices. However, when it comes to applying this understanding in the classroom, the level of integration remains low. Teachers were asked whether they incorporate digital tools to explore sustainability, use examples showing the role of technology in achieving environmental goals, or assign projects that connect digital solutions with environmental challenges. The responses indicated that such practices are not yet common or systematic.

Several constraints were identified as barriers to deeper engagement. These include limited access to advanced digital tools and platforms (including AI), poor and unstable internet connectivity, and a lack of sufficient training opportunities for faculty. In addition, many teachers face time constraints that prevent them from exploring new tools or revising their teaching approaches. Institutional support to encourage and reward innovation in teaching remains minimal. Altogether, this limits the ability of faculty to fully embrace and implement the twin transition in a pedagogically sound and effective manner.

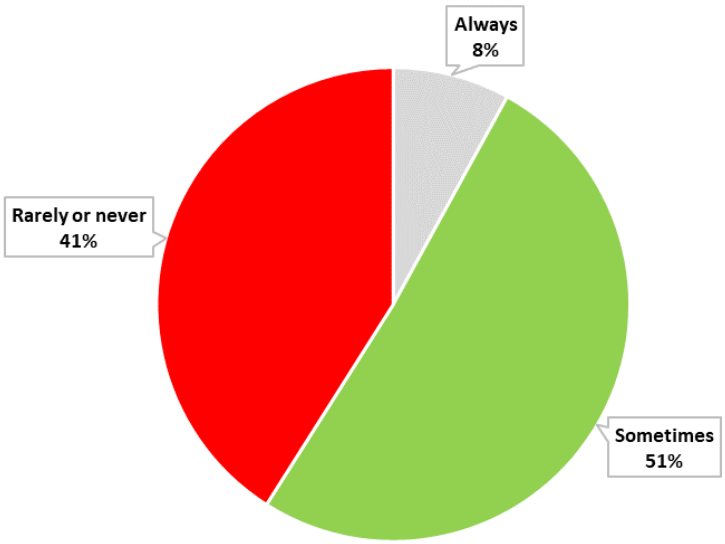


Figure 10: Twin transition: extent to which teachers incorporate digital tools for achieving sustainability in teaching.

1.7.3 Student Self-Assessment Findings

Student responses suggest that while the concept of the twin transition is moderately familiar to them, their academic experience does not fully prepare them for its real-world application. A majority of students believe they are better prepared for digital transformation than for green transition. When asked to choose which transition their education best equips them for, most selected digital transformation, followed by those who selected both. Far fewer selected green transformation, while a notable portion selected neither.

When reflecting on how well their courses provide practical opportunities to apply twin transition knowledge such as through case studies or hands-on projects many students said this was achieved only to some extent. In terms of confidence, most students reported feeling moderately or slightly confident in their ability to contribute to the twin transition. Fewer felt very confident, and a small number indicated they were not confident at all.

Although students acknowledged that resources such as workshops, online tools, and seminars exist to support their learning, they identified significant gaps in the curriculum. Topics they felt needed more emphasis included digital technologies like AI, data science, and cybersecurity, followed by entrepreneurship for sustainable development, interdisciplinary collaboration, and environmental sustainability areas such as climate change and circular economy. Students also expressed that while professors provide some level of support for learning about the twin transition, the support is only somewhat adequate. The teaching methods used in relevant courses are perceived as moderately engaging rather than fully interactive or hands-on. Students recommended more practical and experiential learning approaches to help them understand and apply the twin transition in real-world contexts.

When asked to identify the most important skills for the future workforce in relation to the twin transition, students highlighted digital literacy and technological proficiency, environmental and sustainability knowledge, problem-solving and critical thinking, project management and leadership, as well as effective communication and collaboration.

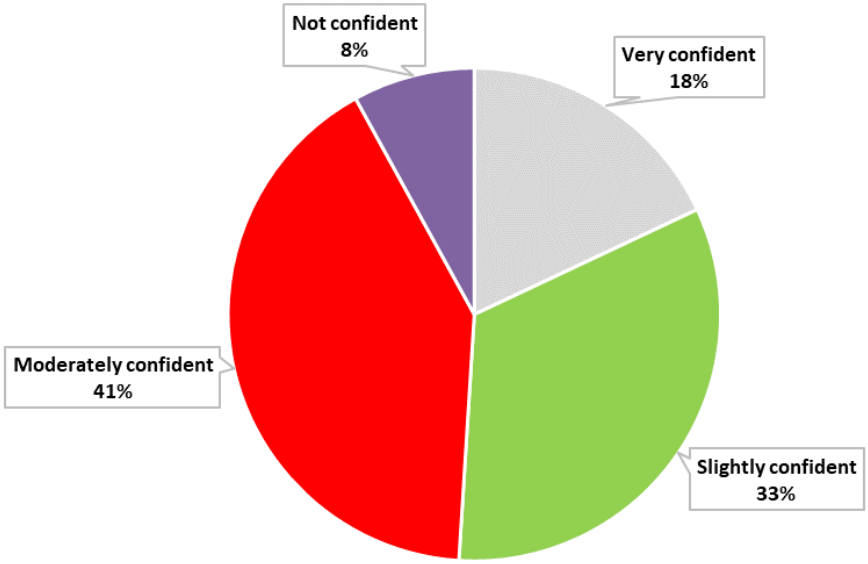


Figure 11: Twin transition: extent to which students feel confident in their ability to contribute to the digital and green transitions in their future career

1.7.4 Findings from the industry

Feedback from employers revealed that graduates currently do not demonstrate strong abilities to integrate digital and green skills in the workplace. In fact, only one reported case was noted where a graduate had applied such knowledge in a research project. Across most industries, digital skills continue to take precedence, with green initiatives being secondary and less embedded in daily operations. However, a few exceptions were observed. Some technology firms have begun using digital tools for environmental purposes, such as agricultural assessments involving tree quality monitoring. Additionally, an NGO was reported to be in the process of adopting digital technologies for air quality monitoring. These examples suggest that while integration is rare, there is a growing space for innovation at the intersection of digital and environmental efforts.

Summary of findings

The university is in the early stages of addressing the twin transition, with awareness slowly emerging among management, faculty, and students. However, formal integration and practical implementation remain limited.

- While some digital transformation has taken root, the environmental sustainability component is often less visible or underdeveloped.
- Teachers lack the training and resources to effectively link both domains, and students though moderately confident need more experiential learning to apply what they know.
- Employers report that graduates are not yet proficient in integrating digital and green competencies.

A coordinated institutional approach, strategic investments, and enhanced curriculum design are essential to prepare students and staff for the demands of a twin transition-ready future.

Strategic Action to improve Twin transition education in the next 3years

1. Increase awareness and capacity building
2. Training
3. Commitment to increase the infrastructure there currently is.
4. Formalizing Twin transition into a policy

Recommendations for improving Twin transition

1. Increase industry-academia collaboration
2. Expose students to hands more practical use of digital tools
3. Encourage to industry to invest on mass internship and capacity building programs
4. Employers must be encouraged to provide infrastructure and policies that facilitate integration of green and sustainable practices at workplace
5. Employers should sponsor HR development progressively

1.8 SWOT Analysis of Preparedness for the Twin Transition

STRENGTHS • Skilled researchers • Existing research centres aligned with twin transition goals • Relevant academic programmes and courses • The enthusiasm of teachers and students towards twin transition • University level support for twin transition. E.g. in strategic plan • Government support to digital transformation • Government support to green deal. Eg., Green Ghana Project and the National Climate Change Policy aligns well with university goals • Strong reputation	**WEAKNESSES** • Limited funding • Lack of trained resource personnels in twin transition • Limited of digital infrastructure eg. • Slow internet, technologies • The generally poor conditions of • Ghanaian academics threaten the attraction and retention of skilled faculty • Bureaucratic processes, especially on approving courses
OPPORTUNITIES • Potential for academic-industry partnership • International collaboration • Opportunity for funding • Partnership with government • Leverage of institutional research centres and course offerings	**THREATS** • Resistance to change by some students and teachers • Competition from other universities for funding • Cybersecurity risks • Challenges of retaining top talent, as faculty members and researchers may be attracted to other institutions with more advanced twin transition initiatives.

1.9 The key areas for further intervention to enhance preparedness for the Twin Transition

No.	Activity	Dimension	Who	When
1	Enhance staff capacity via Trainings	Capacity building	Faculties and university level	Quarterly
2	Build Research Capacity	Research Excellence	Faculties, university level	Quarterly
3	Update Curriculum on sustainability	Curriculum Relevance	Faculties	Every 2years
4	Stakeholder engagement	Stakeholder Participation	Faculties, university level	Quarterly
5	Explore Funding support	Financial sustainability	Faculties, university level	Regularly
6	Partner more with the industry	Industry Collaboration	Faculties, university level	Occasionally
7	Develop new courses on twin transition	Curriculum innovation	University level and faculties	Once
8	Organize conferences on twin transition	Knowledge sharing	Faculties, university level	Quarterly
9	Partner internationally	Global Engagement	Faculties, university level	Rolling basis
10	Improve digital infrastructure	Digital Transformation	University level	Yearly

1.10 ANNEXES

Annex 1. List of study programmes related to green and digital transition

No.	Name of study Programme	Faculty/Department/School	Level BSc/MSc/PhD.
1	PhD in Climate Change and Sustainable Development	Centre for Climate Change and Sustainability Studies (C3SS) - CBAS	PhD
2	PhD in Environmental Science	Institute for Environment and Sanitation Studies (IESS) - CBAS	PhD
3	PhD in Computer Science	Department of Computer Science - CBAS	PhD
4	PhD in Operations and Management Information Science	Department of Computer Science - CBAS	PhD
5	PhD in Computer Engineering	Department of Computer Engineering - CBAS	PhD
6	MSC Business Analytics	Department of Operations and Management Information Systems - UGBS	MSC
7	MBA Business Intelligence and Analytics	Department of Operations and Management Information Systems - UGBS	MBA
8	MBA Management Information Systems	Department of Operations and Management Information Systems - UGBS	MBA
9	MSC Business Analytics	Department of Operations and Management Information Systems - UGBS	MSC
10	MBA Operations and Supply Chain Management	Department of Operations and Management Information Systems - UGBS	MBA
11	MBA Management Information Systems	Department of Operations and Management Information Systems - UGBS	MBA
12	Master of Laws (Ll.M.) In Information Technology Law	Private Law/Public Law – School of Law	MA
13	Master of Arts (M.A.) in Information Technology Law	Private Law/Public Law – School of Law	MA

No.	Name of study Programme	Faculty/Department/School	Level BSc/MSc/PhD.
14	Master of Laws (Ll.M.) in Energy Law	Private Law/Public Law – School of Law	MA
15	Master of Arts (M.A.) in Energy Law	Private Law/Public Law – School of Law	MA
16	Master of Laws (Ll.M.) in Natural Resources Law	Private Law/Public Law – School of Law	MA
17	Master of Arts (M.A.) in Natural Resources Law	Private Law/Public Law – School of Law	MA
18	Bachelor of Science in Business Administration	Department of Operations and Management Information System	BSC
19	Bachelor of Science in Computer Science	Department of Computer Science - School of physical and Mathematical Sciences	BSC
20	Bachelor of Science in Information Technology.	Department of Information Studies - School of Information and Communication Studies	BSC

Annex 2. List of courses/subjects related to green and digital transition

Annex 2a. Core Courses for First Year Undergraduates

No.	Name of course/subject	Name of Study Programme	Colleges	Level BSc/MSc/PhD
1	Science and Technology in our Lives	UGRC	CBAS/COH/COE	BSC/BA
2	Introduction to African Studies/ Appropriate Technology for Development in Africa	UGRC	CBAS/COH/COE	BSC/BA
3	Introduction to Computing in Business	UGRC	UGBS - COH	BSC/BA
4	Computer Applications Management	UGRC	UGBS - COH	BSC/BA

Annex 2b: Graduate and Undergraduate Courses - College of Humanities (COH)

No.	Name of course/subject	Name of study Programme	School	Level
	COH			
1	Health Statistics and Information Systems	MPhil Health Services Management	UGBS	MPhil
2	Business Information systems	MPhil Marketing	UGBS	MPhil
	Internet business and electronic marketing			
3	Computerised Accounting Techniques	MSC Public Financial Administration	UGBS	MSC
4	Digital and Innovative Finance, Computerised Accounting Technique	MSC Tax Policy and Finance	UGBS	MSC
5	Computerised Accounting Technique	MSC Forensic Accounting and Fraud Examination	UGBS	MSC
6	Unsupervised Machine Learning	MSC Business Analytics	UGBS	MSC
	Programming for Analytics			
	Data Wrangling			
	Database Management			
	Business Intelligence			
	Supervised Machine Learning			
	Advanced Text Analytics			
7	Technology and Innovation in International Business	MSC International Business	UGBS	MSC
8	Electronic Marketing Strategy	MA Marketing Strategy	UGBS	MA
9	Management Information Systems	MA Organisational Leadership and Governance	UGBS	MA
10	Management Information Systems	MBA HRM	UGBS	MBA
11	Management Information Systems	MBA Operations and Supply Chain Management	UGBS	MBA
12	Management Information Systems, Information systems analysis, Information Technology Policy and; strategy, software engineering	MBA Management Information Systems	UGBS	MBA

No.	Name of course/subject	Name of study Programme	School	Level
13	Internet business and electronic marketing, Management Information Systems	MBA Marketing	UGBS	MBA
14	Management Information Systems	MBA Health Services Management	UGBS	MBA
15	Management Information Systems	MBA Finance	UGBS	MBA
16	Management Information Systems	MBA Accounting	UGBS	MBA
17	Information Management	EMBA - Entrepreneurial Management	UGBS	EMBA
18	Information Management	EMBA Marketing	UGBS	EMBA
19	Information Management	EMBA – HRM	UGBS	EMBA
20	Information Management	EMBA – Project Management	UGBS	EMBA
21	Database systems, Data Management and Analysis with Spreadsheets	MSC Business Intelligence and Analytics	UGBS	MSC
	Programming for Business Analytics,			
	Supervised Machine Learning			
	Management Information Systems			
	Unsupervised Machine Learning			
	Advanced Tools in Machine Learning with applications			
22	Electronic marketing essentials	BSC Administration, E-Commerce and customer management	UGBS	BSC
	Mobile commerce and marketing			
	Introduction to e-service management			
23	Accounting Information Systems	BSC Administration - Accounting	UGBS	BSC
24	ICT and Public Administration	BSC Administration – Public Administration	UGBS	BSC
25	Introduction to Electronic Business	BSC Administration-Marketing	UGBS	BSC
26	Cyber Law	Master of Laws (Ll.M.) in Information Technology Law & Master of Arts (M.A.) in Information Technology Law	School of Law	MA
	Artificial Intelligence and Robotics Law			
	Technology Transfer			
	E-Governance			
	E-Commerce			

No.	Name of course/subject	Name of study Programme	School	Level
27	Renewable Energy Law, Policy and Practice	Master of Laws (Ll.M.) in Energy Law & Master of Arts (M.A.) in Energy Law	School of Law	MA
	Energy Law - Downstream and Electricity Markets			
	International Energy and Environmental Law, Policy and Practice			
	Electricity Markets and Low Carbon Energy Law			
28	Environmental Protection in Natural Resources Extraction: Law, Policy and Trends	Master of Laws (Ll.M.) in Natural Resources Law & Master of Arts (M.A.) in Natural Resources Law	School of law	MA
	Renewable Energy Law and Policy			
	Environmental Aspects of Oil and Gas Law			
	Marine Ecology & Environmental Protection			
29	Technology, Artificial Intelligence and Cybersecurity in Law Practice	Paralegal Practice (M.A. & LL.M.)	School of Law	MA

Annex 2c: Graduate and Undergraduate Courses - College of Basic and Applied Sciences (CBAS)

No.	Name of course/subject	Name of study Programme	School	Level
	CBAS			
1	Computer Applications	M.A. Agricultural Administration/MPhil Agribusiness/M.Phil. Agricultural Economics	School of Agriculture	MA
2	Meat Science and Technology/Biotechnology in Animal Science	M.Phil. and M.Agric. in Meat Science/Technology	School of Agriculture	MPhil
3	Remote Sensing & Geographical Information System	MPhil/M. Agric in Pasture and Range Management	School of Agriculture	MPhil
4	Technology for Small Scale Enterprises	Maters in Home Science		MA
5	Computer Science Applications	MPhil Soil and Water Engineering	School of Agriculture	MPhil
	Remote Sensing and Geographical Information Systems			MPhil
6	Principles And Applications of Biotechnology	MPhil in Biochemistry, Cell and Molecular Biology	School of Biological Sciences	MPhil
7	Environmental Studies	MPhil Botany	School of Biological Sciences	MPhil
	Plant Molecular Genetics, Genetic Engineering and Biotechnology			
	Computer Science			
	Sustainable Management of Plant Genetic Resources			
8	Remote Sensing	MPhil In Molecular Biology	School of Biological Sciences	MPhil
9	Bioinformatics	M. Phil Entomology (Insect Science Programme)	School of Biological Sciences	MPhil

No.	Name of course/subject	Name of study Programme	School	Level
10	Radioactive And Urban Waste Management.	MPhil In Nuclear and Environmental Protection	School of Biological Sciences	MPhil
11	Sustainable Agricultural Production	MPhil In Nuclear Agriculture	School of Agriculture	MPhil
12	Computational Methods in Engineering	MPhil In Nuclear Science and Engineering	School of Engineering Sciences	MPhil
	Seminar 1 (Programming Techniques for Artificial Intelligence Computer Graphics Simulation And 3 Visualization)			
	Computational Optimization (Optimization Methods for System and Control)			
	Practicals (Programming Skills)			
13	Information Systems Analysis and Design	Master of Health Informatics	School of Physical and Mathematical Sciences	MA
	Data Analysis & Software Applications			
	Geographic Information System Applications			
	Web Technology			
	Software Engineering			
	Radiation Processing of Industrial Products/Polymers and Environmental Waste			
14	Information Systems	Bachelor of Science in Computer Science	School of Physical and Mathematical Sciences	BSC
15	Advanced Web Technologies			
	Introduction To Parallel Computing			
	Database Management Systems			
	Introduction To Computer Graphics			
	Programming Iii (Vb .Net)			
	Introduction To Robotics			
	Software Engineering			

No.	Name of course/subject	Name of study Programme	School	Level
	Introduction To Artificial Intelligence			
	Computer Vision			
	Operating Systems			
	Web Technologies & Development			
	Digital Electronics			
	Programming I (With C++)			
	Computer Organization and Architecture			
	Programming Ii (Java)			
16	Introduction To Information Technology	Bachelor of Science in Information Technology.	School of Physical and Mathematical Sciences	BSC
17	Object Oriented Techniques for Problem Solving			
	Database Fundamentals			
	Introduction To Computer and Networks			
	Applied It Programming			
	Multimedia And Web Design			
	Mobile Development			
	Human Computer Interaction			
	Operating Systems Fundamentals			
	Digital And Logic Systems Design			
	Programme Design and Data Structures			
	Event-Driven Programming			
	Web Development			
	Web Site Administration			
	Web Development Using Content Management Systems			
	Graphics & Information Visualization			
	Web Ii: Advanced Web Development			
	Applied Knowledge Technologies for the Semantic Web			

No.	Name of course/subject	Name of study Programme	School	Level
	Cloud Computing			
	Applications Of Digital Technologies			
	Database Technology and Programming			
	Information Storage and Management Technologies			
	Information Retrieval and Xml Data			
	Web Ii Advance Web Development			
	Information Storage and Management Technologies			
	Voice Communications Technologies			
	Fundamentals of Satellite Communications			
	Web Development and Multimedia Development – E-Business			
	Advance Web Technologies- E-Commerce			
	Information Defense Technologies			
	Database Technology and Programming			
	Parallel & Distributed Databases			
	Data Mining & Data Warehousing			
	Computer Hardware Fundamentals			
	Introduction To It Problem Solving			
	Introduction To Computing			
	Programming Fundamentals			
18	Mechanics And Thermal Physics	BSC in Mathematics	School of Physical and Mathematical Sciences	BSC
	Introduction To Computer Science I			
	Programming Fundamentals			

No.	Name of course/subject	Name of study Programme	School	Level
	Introductory Computational Mathematics			
19	Databases	BSC in Statistics	School of Physical and Mathematical	BSC

Annex 2d: Graduate and Undergraduate Courses - College of Education (COE)

No.	Name of course/subject	Name of study Programme	School	Level
COE				
1	Sustainable Development and Environmental Issues	BA Adult Education and Human Resource Studies	School of Continuing and Distance Education	BSC/BA
2	Introduction to Information technology	BA Information Studies	School of Information and Communication Studies	BA
	Introduction to computing			
	Database Management			
	Automation of Information systems			
	Automated Information Retrieval			
	Programming of information system Application			
	Telecommunications and Information Network			
3	Education for sustainable development	BSC/BA Education	School of Education and Leadership	BSC/BA
	Video games and Learning			
	Multimedia tools in Education			
	Teaching mathematics with technology			
	Introduction to Technology in education			

Annex 3. List of Colleges, Schools and Departments of UG

Colleges	Schools	Departments
College of Basic and Applied Sciences (CBAS)	School of physical and Mathematical Sciences	Department of Physics
		Department of Mathematics
		Department of Statistics and Actuarial Science
		Department of Chemistry
		Department of Computer Science
		Department of Earth Science
	School of Biological Sciences	Department of Plant and Environmental Biology
		Department of Animal Biology and Conservation Science
		Department of Marine and Fisheries Sciences
		Department of Biochemistry, Cell and Molecular Biology
		Department of Nutrition and Food science
	School of Agriculture	Department of Crop Science
		Department of Soil Science
		Department of Animal Science
		Department of Family and Consumer Sciences
		Department of Agricultural Economics and Agribusiness
		Department of Agricultural Extension
	School of Veterinary Medicine	Department of Veterinary Anatomy and Physiology
		Department of Veterinary Pathology
		Department of Veterinary Microbiology and Parasitology
		Department of Veterinary Public Health and Preventive Medicine
		Department of Veterinary Surgery and Theriogenology
		Department of Veterinary Clinical Studies
		Department of Animal Science
	School of Engineering Sciences	Department of Computer Engineering
		Department of Materials Science and Engineering
		Department of Biomedical Engineering

Colleges	Schools	Departments
		Department of Agricultural Engineering
		Department of Food Process Engineering
College of Education (COE)	School of Information and Communication Studies	Department of Information Studies
		Department of Communication Studies
	School of Education and Leadership	Department for Educational Studies and Leadership
		Department of Physical Education and Sport Studies
		Department of Teacher Education
	School of Continuing and Distance Education	Department of Distance Learning
		Department of Adult Education and Human Resource Studies
College of Health Sciences(COHS)	University of Ghana Medical School	Department of Anaesthesia
		Department of Anatomy
		Department of Chemical Pathology
		Department of Child Health
		Department of Haematology
		Department of Medical Biochemistry
		Department of Medical Microbiology
		Department of Medical Pharmacology
		Department of medicine and Therapeutics
		Department of Obstetrics and Gynaecology
		Department of Pathology
		Department of Physiology
		Department of Psychiatry
		Department of radiology
		Department of Surgery
	University of Ghana Dental School	Department of Biomaterial Sciences
		Department of Oral Biology
		Department of Oral and Maxillofacial Surgery
		Department of oral Pathology and Medicine
		Department of Orthodontics and Paedodontics
		Department of Preventive and Community Dentistry
		Department of Restorative Dentistry

Colleges	Schools	Departments
	School of Public Health	Department of Biological, Environmental and Occupational Health
		Department of Biostatistics
		Department of Epidemiology and Disease Control
		Department of Health Policy, Planning and Management
		Department of population, Family and Reproductive Health
		Department of Social and Behavioural Sciences
	School of Nursing and Midwifery	Department of Adult Health
		Department of Community Health Nursing
		Department of Mental and Child health
		Department of Mental Health
		Department of Research, Education and Administration
	School of Pharmacy	Department of Pharmaceutical Chemistry
		Department of Pharmacognosy and Herbal medicine
		Department of Pharmaceutics and Microbiology
		Department of Pharmacy Practice and Clinical Pharmacy
		Department of Pharmacology and Toxicology
	School of Biomedical and Allied Health Sciences	Department of Audiology, Speech and Language
		Department of Medical Laboratory Sciences
		Department of Nutrition and Dietetics
		Department of Occupational therapy
		Department of Physiotherapy
		Department of Radiography
		Department of Respiratory Therapy
College of Humanities (COH)	University of Ghana Business School	Department of Accounting
		Department of Finance
		Department of Marketing and entrepreneurship

Colleges	Schools	Departments
		Department of Public Administration and Health Services Management
		Department of Operations and Management Information System
		Department of Organisation and HR Management
	University of Ghana School of Law	International Legal Studies
		Private Law
		Public Law
	School of Arts	Department for the Study of Religions
		Department of Philosophy and Classics
		Department of History
		Department of Archaeology and Heritage Studies
	School of Languages	Department of English
		Department of French
		Department of Modern Languages
		Department of Linguistics
	School of Social Sciences	Department of Economics
		Department of Political Science
		Department of Sociology
		Department of Geography and Resource Development
		Department of Social Work
		Department of Psychology
	School of Performing Arts	Department of Dance Studies
		Department of Theatre Arts
		Department of Music

2 The Report on Local Industry Needs and the Knowledge Gap Specification of the University of Winneba, Ghana

2.1 University at a Glance

The University of Education, Winneba (UEW) was established in 1992 with the mandate to train professional educators to enhance Ghana's education system. As one of the country's leading teacher training institutions, UEW plays a critical role in shaping the future of education by producing high-quality educators for various levels of the Ghanaian education system. The university operates across two main campuses—Winneba (the main campus) and Ajumako—offering diverse programs that align with the nation's educational and developmental needs.

UEW comprises six (6) faculties that provide specialized academic training and five (5) schools. These faculties and schools cater to thousands of students across different disciplines, ensuring that teacher education remains relevant in an evolving academic and professional landscape.

Faculties	**Schools**	**Projects**	**Research**
Science Education	Business	Digital Education	Education policy
Ghanaian Languages Education	Comm. and Media Studies	Curriculum innovation	Language studies
Applied Behavioral Sciences Education	Creative Arts	Inclusive learning methodologies	Science technology education
Health, Allied Sciences, and Home Economics Education	School of Education and Lifelong Learning		Special education
Social Sciences Education	Graduate Studies		Agricultural education
Foreign Languages Education			
Number of Staff **(1700)**	Student enrolment **(10,000 to 14,999)**	Student population **+70,000** (Regular and distance)	Number of Campuses **(2)**

Situated in the **Central Region of Ghana**, UEW plays a significant role in the local economy, particularly through its collaboration with schools, educational institutions, and regional development initiatives. The university supports teacher training programs that directly impact primary and secondary education quality while fostering partnerships with industry players to enhance Research and practical learning experiences. Additionally, its alumni network continues to grow, with thousands of graduates contributing to various sectors of the economy, particularly in education, governance, and Research.

UEW has achieved significant milestones, including recognition for its contributions to educational Research, teacher training, and curriculum development. The university has been involved in numerous national and international projects and Research, positioning itself as a key driver of academic progress in Ghana. Internationally, UEW collaborates with universities and institutions across Africa, Europe, and North America, promoting faculty and student exchange programs, joint Research, and capacity-building projects. These partnerships help enhance its programs' global relevance while exposing students and faculty to international best practices in education.

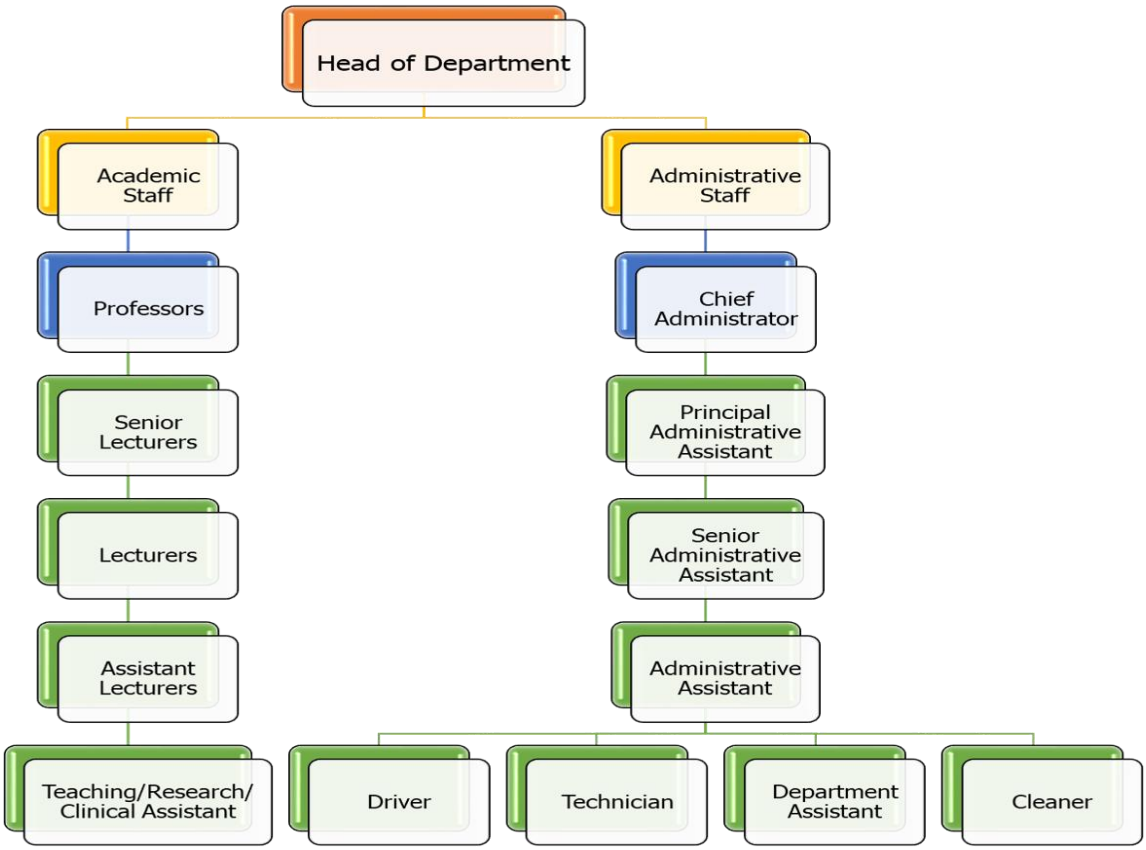
Beyond its academic excellence, UEW is committed to sustainability, innovation, and digital transformation in education. The university continually seeks to integrate modern technology into teaching methodologies, ensuring its graduates have the skills needed for 21st-century education and workforce demands. With a strong vision for the future, UEW continues to be a pillar of educational transformation in Ghana and beyond.

2.2 University Organization and Management

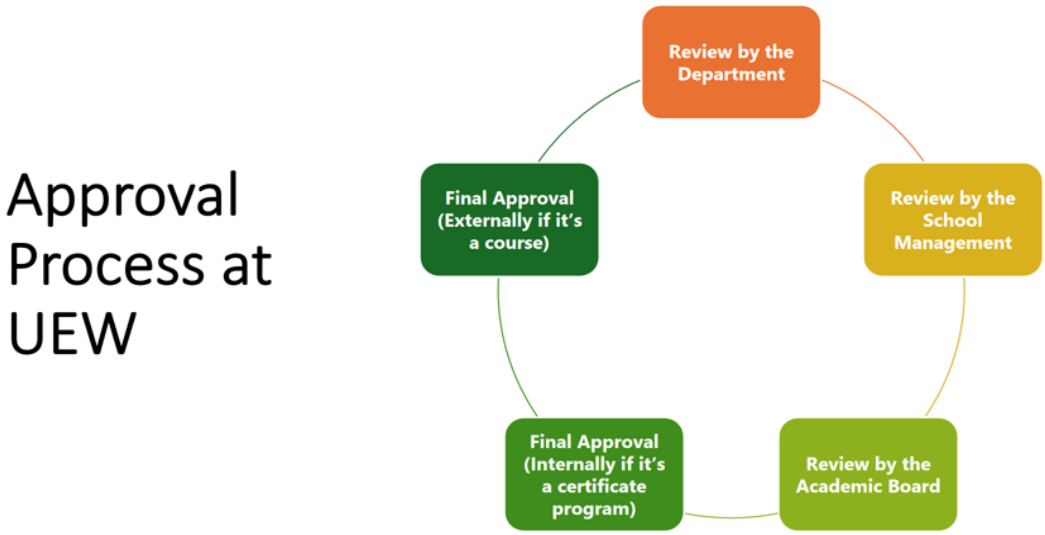
The University of Education, Winneba (UEW) is a public institution established in 1992, dedicated to training professional educators to enhance Ghana's education system. The university's workforce is distributed across various roles, including teaching faculty (550), full-time researchers (8), and non-academic staff (1215), such as administrative, technical, and support personnel.

UEW is a public institution operating under the governance of Ghana's Ministry of Education.

The University Council is the highest governing body responsible for overarching policy decisions and strategic direction. The academic board oversees academic matters, including curriculum development, academic standards, and research initiatives. Deans lead faculties, coordinate departmental activities, and ensure alignment with university policies, while Heads of Departments (HoDs) manage departmental operations, oversee academic programs, and report to their respective Deans. Below is an aspect of the organogram flowing from the administrative and academic staff. This structured approach facilitates effective decision-making and promotes collaborative governance throughout the university.



The university strongly emphasizes quality assurance and has established a Directorate of Quality Assurance to oversee and enhance the quality of its academic and administrative functions. The directorate evaluates or influences curricula by ensuring the approval process shown in the approval process at UEW is followed.



This directorate initiates quality assurance meetings and workshops, ensuring the institution meets national and international educational standards.

Training and development are integral to UEW's commitment to excellence. The university regularly offers training programs for academic staff in various areas, including best practices, teaching, and pedagogical development, research development, career and leadership skills, quality assurance and accreditation, internationalization and collaboration, personal and professional well-being, specialized training for the green transition, and specialized training for digital transition.

For instance, newly appointed Faculty Quality Assurance Officers undergo training to equip them with essential skills and knowledge for their roles. Additionally, studies have examined the effect of training and development on senior administrative staff's performance at UEW, highlighting the institution's dedication to continuous professional development. In Summary, the University of Education, Winneba, as a public institution, maintains a diverse workforce and is committed to quality assurance and the continuous development of its staff across various domains.

2.3 Education

The University of Education, Winneba (UEW) serves a student population of over 60,000 across various academic levels through 47 teaching departments and 268 academic programs. Of these, 162 are undergraduate, 75 are master's, 14 are doctoral, and 2 are postgraduate diploma programs. A growing subset of these offerings includes **explicit green and digital transition programmes**, such as:

Green Programmes:

- BSc Environmental Sustainability and Education
- BSc Renewable Energy Technologies
- MSc Climate Change and Sustainable Development
- PhD Educational Technology and Sustainability Integration

Digital Programmes:

- BSc Information and Communication Technology
- MSc Digital Learning and Educational Innovation
- PhD Educational Technology and Sustainability Integration

These programmes are supported by integrated courses such as **Renewable Energy Systems**, **Artificial Intelligence in Education**, **E-learning Platforms and Digital Pedagogies**, and **Smart and Green Infrastructure Design**, indicating an intentional curriculum shift toward contemporary global challenges. UEW has embraced several pedagogical innovations to enhance learning, including **Learning Management Systems (LMS)** deployed across faculties for blended learning, **Digital Literacy, and ICT Integration** as core to several programmes and **Green Campus Campaigns** and student-led sustainability initiatives enhancing experiential learning.

UEW operates **18 regional distance learning centres** with over 1,000 tutors, offering access to higher education across Ghana’s underserved and remote communities. This initiative

aligns with UEW's mission to ensure **inclusive education** while promoting environmental sustainability by reducing the carbon footprint associated with on-campus-only learning.

UEW employs over 1,700 staff, including 550 faculty and 1,215 non-academic professionals. Its recruitment policy emphasizes **disciplinary expertise**, especially in emerging fields like green and digital education, **diversity, and inclusion**, targeting regional equity and gender balance. The policy shows c**ontinuous professional development**, with mandatory induction and periodic training in green pedagogy, e-learning tools, and curriculum innovation. UEW's recruitment strategy emphasizes q**uality assurance alignment**, requiring all newly recruited staff to undergo training coordinated by the Directorate of Quality Assurance.

2.4 Self-assessment of key dimensions

2.4.1 GOING GREEN: Supporting Sustainable Goals

2.4.1.1 University Self-Assessment Findings on Green Transition

This section presents findings from the self-assessment of university management, deans, and professors at the University of Education, Winneba (UEW). It focuses on six critical indicators reflecting the institution's engagement with sustainability, green education, and circular economy principles. The analysis shows gaps, strengths, and opportunities for strategic improvements. While respondents are generally aware of sustainability concepts, institutional commitment remains fragmented, under-resourced, and weakly embedded in the university's operational and academic frameworks.

Strategic Commitment to Sustainability

The results, shown in **Figure 1**, indicate that while 17 respondents disagreed and 3 remained neutral regarding the presence of a formal sustainability strategy, only a small group (5 agreed and 3 strongly agreed) acknowledged its existence.

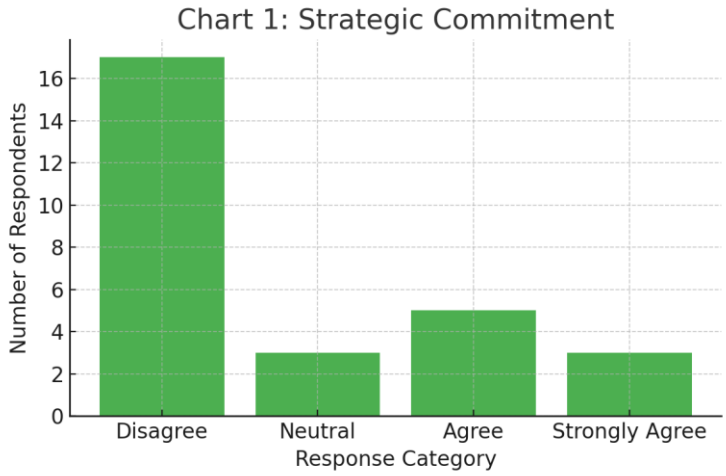


Figure 1: Strategic Commitment to Sustainability

Notably, no respondents strongly disagreed, which suggests a baseline level of awareness or partial engagement. However, the limited affirmative recognition is an indication of a significant communication gap. Strategy elements exist but are insufficiently disseminated or institutionalized across departments.

Leadership and Resource Allocation

When asked whether university leadership promotes sustainability, 18 respondents disagreed, 4 were neutral, and only 7 (5 agree, 2 strongly agree) affirmed such efforts as illustrated in **Figure 2**: leadership promotion. This indicates that, while acknowledged by leadership in principle, sustainability is not consistently championed across institutional layers.

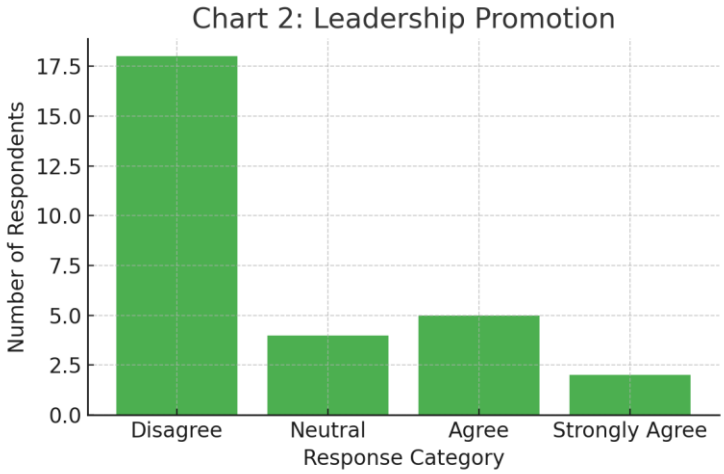


Figure 2: Leadership promotion

An even more pronounced concern arises in terms of resourcing. A striking 23 respondents disagreed that adequate resources are allocated to sustainability initiatives, with only 2 agreeing and none strongly agreeing (as shown in **Figure 3**: Resource allocation).

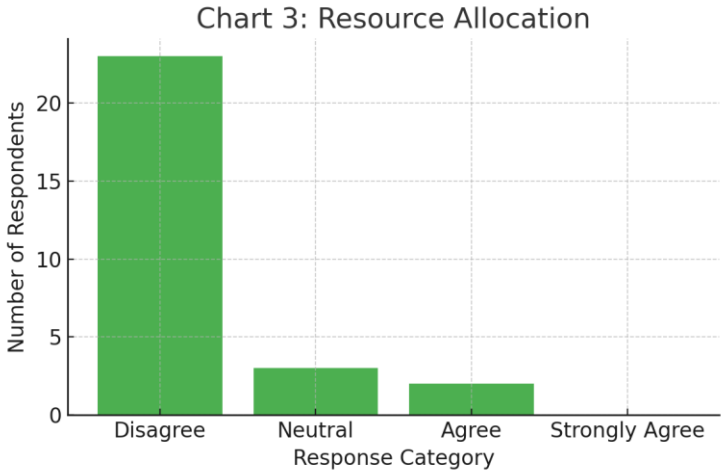


Figure 3: Resource allocation

This points to a gap between rhetorical support and practical commitment, which could hinder UEW's meaningful implementation of sustainability measures.

Curriculum Integration and Green Competence Development

In the survey, as shown in **Figure 4**: Sustainability in Learning, 21 respondents disagreed with the statement that sustainability is embedded into academic curricula, while only 7 agreed and none strongly agreed. This suggests that sustainability themes are largely absent or inconsistently integrated into UEW's academic offerings.

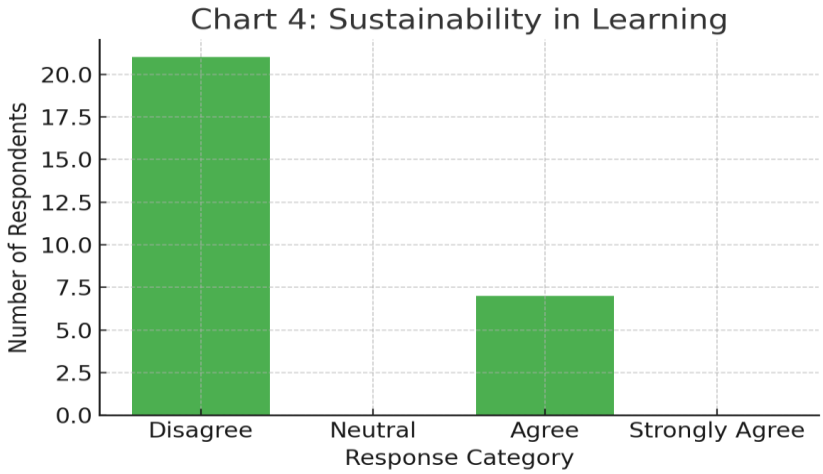


Figure 4: Sustainability in learning

Similarly, the data, as shown in **Figure 5**, show that 19 respondents disagreed, 1 was neutral, and only 7 (6 agree, 1 strongly agree) affirmed the presence of courses that prepare students for green jobs. The underrepresentation of green job pathways limits students' preparedness for evolving labour markets driven by environmental priorities and sustainable development.

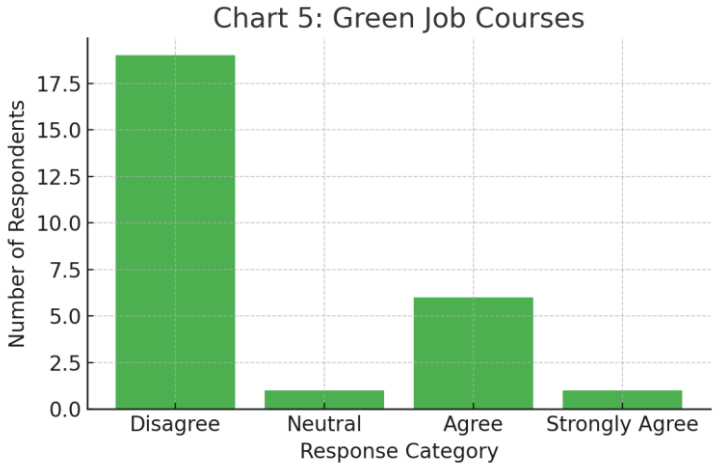


Figure 5: Green job courses

Green Transition in Higher Education

The green transition in higher education focuses on integrating sustainability principles into every aspect of university life, including institutional operations, curriculum development, research activities, and student engagement. At the University of Education, Winneba, there is a clear strategic commitment to this transition. Sustainability goals are embedded in the university's mission and strategic plans. However, the extent to which these principles are implemented varies significantly across different departments, revealing gaps between policy and practice.

Figure 6, 'Sustainability integration across departments,' illustrates varying levels of sustainability integration across academic departments at UEW, with Environmental Science (90%) and Education (75%) leading in embedding sustainability into their curricula. In contrast, Business (50%) and IT (40%) show considerably lower integration, indicative of a disciplinary gap. This suggests that while some departments align well with sustainability goals, others require targeted efforts to embed green principles into teaching and practice, particularly in business and technology. Regarding policy and strategic direction, sustainability is recognized as a priority at the institutional level.

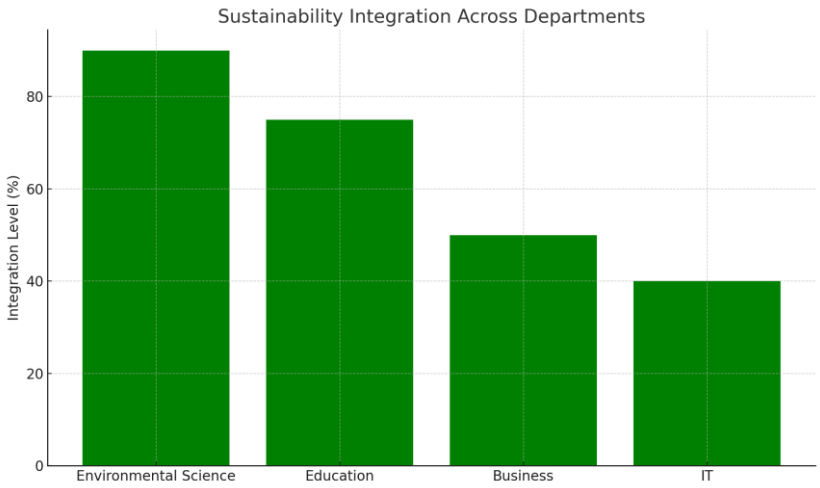


Figure 6: Sustainability integration across departments

Nonetheless, the allocation of financial and human resources to support green initiatives is inconsistent, with some departments facing constraints that hinder effective implementation, as simplified in **Figure 7**.

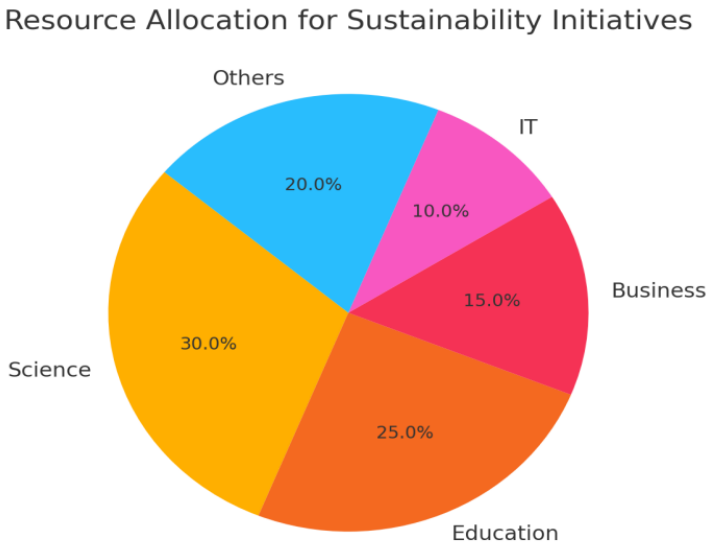


Figure 7: Resource allocation for sustainable initiatives

Faculty members generally demonstrate an awareness of sustainability concepts, and some have integrated them into their teaching. However, many educators lack the confidence or expertise to address the more technical aspects of the green transition, such as renewable energy systems or environmental technologies, as shown in **Figure 8**. Furthermore, interdisciplinary collaboration, which is crucial for holistic sustainability education, remains limited.

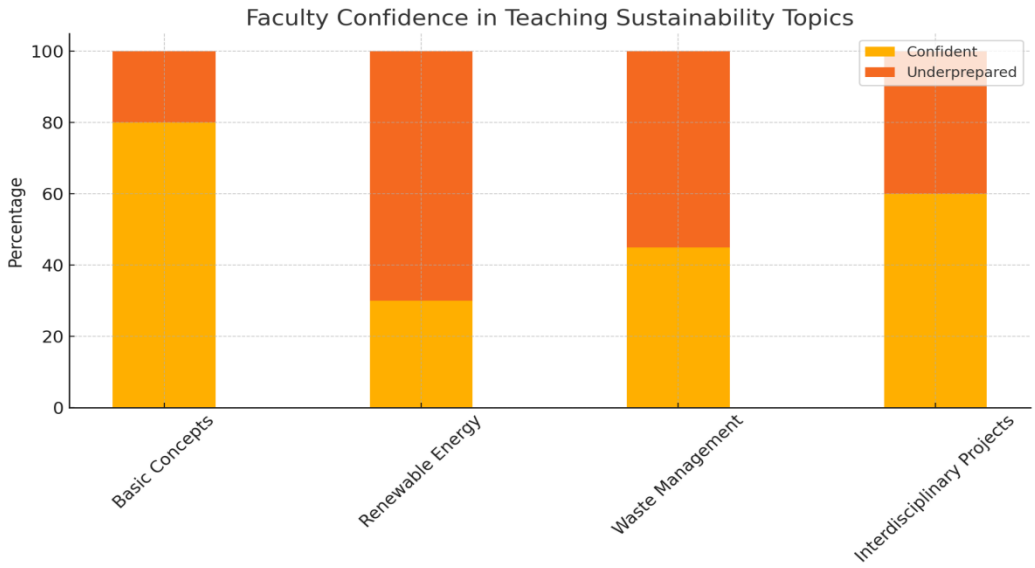


Figure 8: Faculty confidence in teaching sustainability topics

Students at the university are increasingly aware of environmental issues and recognize the importance of sustainability. Yet, they strongly desire more practical learning experiences

that would allow them to engage directly with green concepts. This includes hands-on projects, case studies, and collaboration with external organizations that work on sustainability.

2.4.1.2 Teacher/Faculty Self-Assessment Findings on Green Transition

This section critically synthesizes UEW faculty responses concerning the institution's engagement in sustainability (green transition), digital transformation, and their intersection (twin transition). Survey results reveal a moderate to developing understanding among faculty regarding the green transition. While foundational knowledge of sustainability principles exists, advanced understanding of the circular economy and biodiversity remains limited. **Figure 9** summarizes faculty knowledge across key green transition themes.

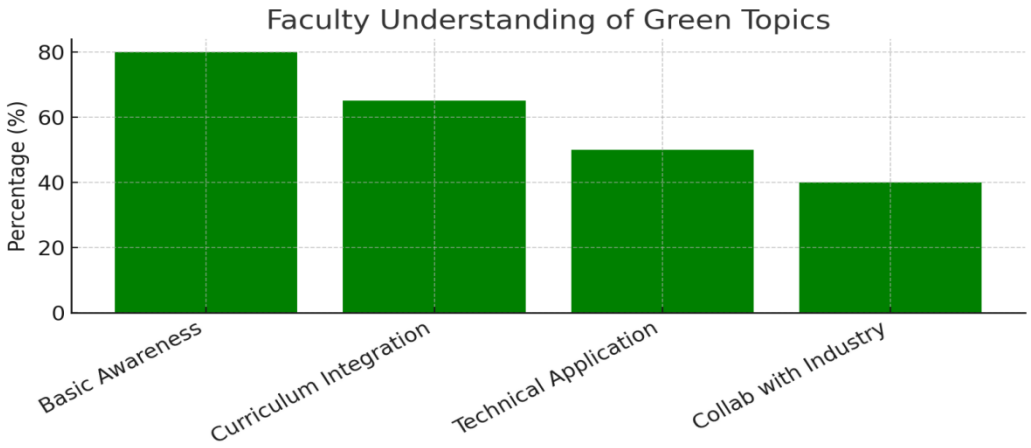


Figure 9: Faculty Understanding of Green Topics

Several challenges currently hinder the effective advancement of the green transition. These include inconsistent training for faculty on how to teach sustainability topics, a lack of integration of green technologies in practical coursework, and minimal collaboration with industry partners on environmentally focused initiatives.

2.4.1.3 Student Self-Assessment Findings on Green Transition

This aspect analyses student perceptions and experiences of the twin transition (digital and green). The findings provide valuable insights into how well current educational structures prepare students for challenges posed by these parallel transitions. The survey results suggest that support from professors was generally positive but inconsistent, and access to resources such as seminars and digital tools was considered fair to adequate. **Figure 10** shows that a significant majority of students want more real-world applications and industry collaboration.

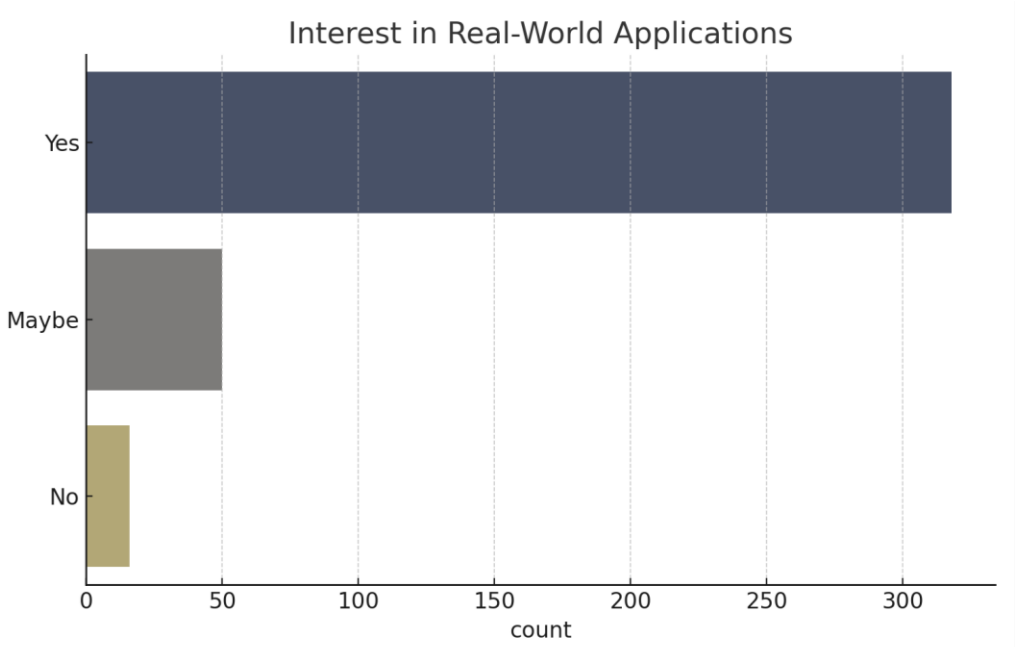


Figure 10: Interest in Real-world applications

Students generally feel more prepared for the digital transition than the green transition (as shown in **Figure 11).**

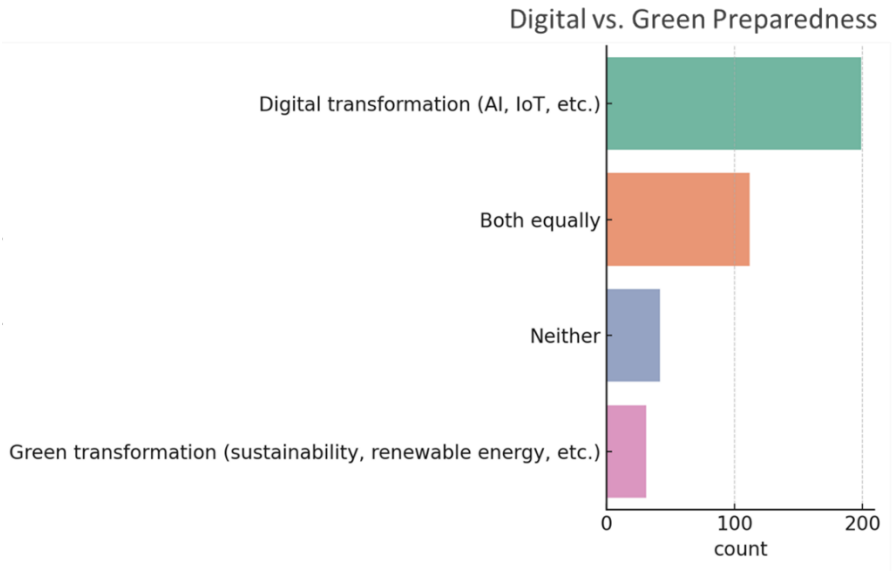


Figure 11: Digital vs. Green Preparedness

Key recommendations for strengthening preparedness for the twin transition in higher education include consistently integrating digital and green transition themes across all academic programs. Institutions should introduce project-based and real-world learning components through active collaboration with industry partners. To foster a culture of sustainability, environmental literacy should be enhanced via dedicated modules focused on

sustainable development. Faculty support is essential, so training programs and incentives should be offered to encourage the adoption of digital-green pedagogies. Expanding access to digital tools, hands-on workshops, and student-led innovation labs will empower learners to engage with and drive the twin transition agenda actively.

2.4.1.4 Findings from Employer Interviews-Green Transition

Employers expressed concerns over graduates' limited exposure to green practices such as waste management, climate literacy, sustainable infrastructure design, and eco-friendly practices in hospitality and public services. Green competencies that were most cited include environmental policy awareness, sustainable procurement, renewable energy, and green Finance. Respondents called for universities to embed environmental education into disciplinary learning and provide opportunities for field-based sustainability projects.

"Employer Satisfaction with Graduates' Green Skills" (as shown in **Figure 12**) illustrates the perceived readiness of graduates in terms of environmental and sustainability competencies across six sectors:

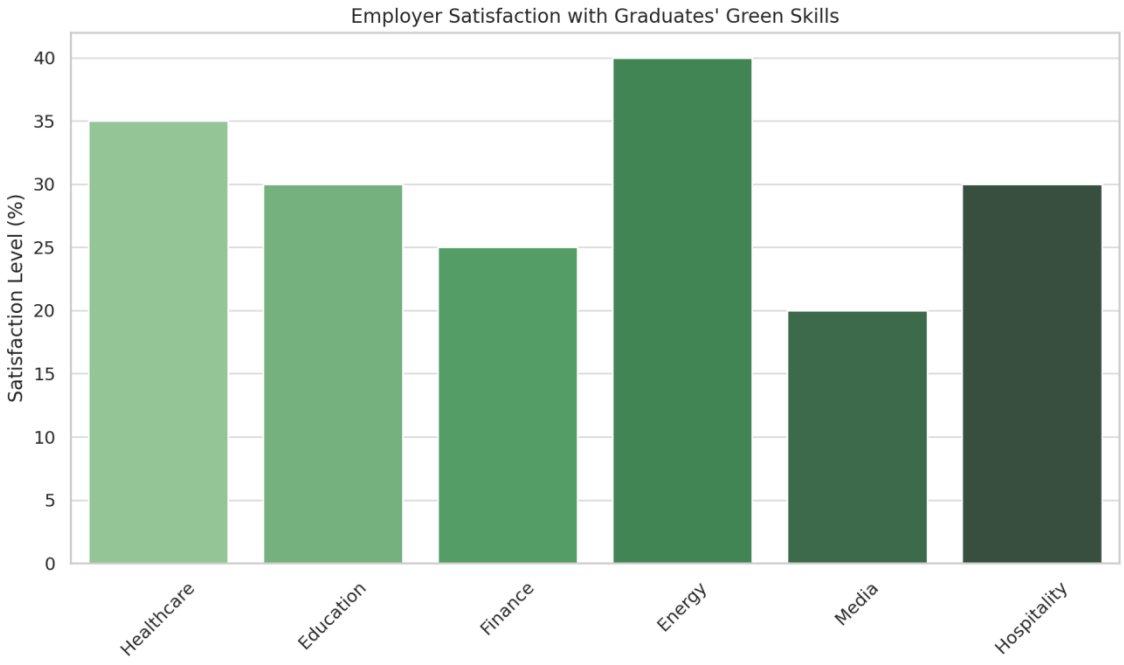


Figure 12: Employer Satisfaction with Graduates' Green Skills

Healthcare, Education, Finance, Energy, Media, and Hospitality. The results reflect consistently low to moderate satisfaction levels, signalling a systemic weakness in sustainability education within higher education curricula. The Energy sector reports the highest satisfaction (40%), likely due to a more direct emphasis on green technologies such as renewable energy systems and energy efficiency, which may be partially addressed in

technical education programs. Healthcare follows at 35%, recognizing the growing relevance of sustainable practices in medical waste management and eco-friendly hospital operations.

Sectors like education and hospitality report satisfaction at around 30%, pointing to some effort toward integrating environmental awareness, yet it is still insufficient in practical training and real-world application. On the lower end, Finance (25%) and Media (20%) indicate an apparent disconnect between university training and the sustainability needs of these industries. Employers in these fields note that graduates often lack knowledge of ESG (Environmental, Social, and Governance) frameworks, green finance principles, or sustainable media production methods.

Overall, the chart underscores a critical need for higher education institutions to expand and deepen sustainability-focused education. Integrating green principles across disciplines—not just in theory but in applied, sector-specific contexts—is essential for preparing graduates to meet the environmental challenges and expectations of the modern workforce.

Graduate Proficiency in Green Skills by Category

Figure 13 presents insights into graduates' readiness to apply green and sustainable practices in the workplace.

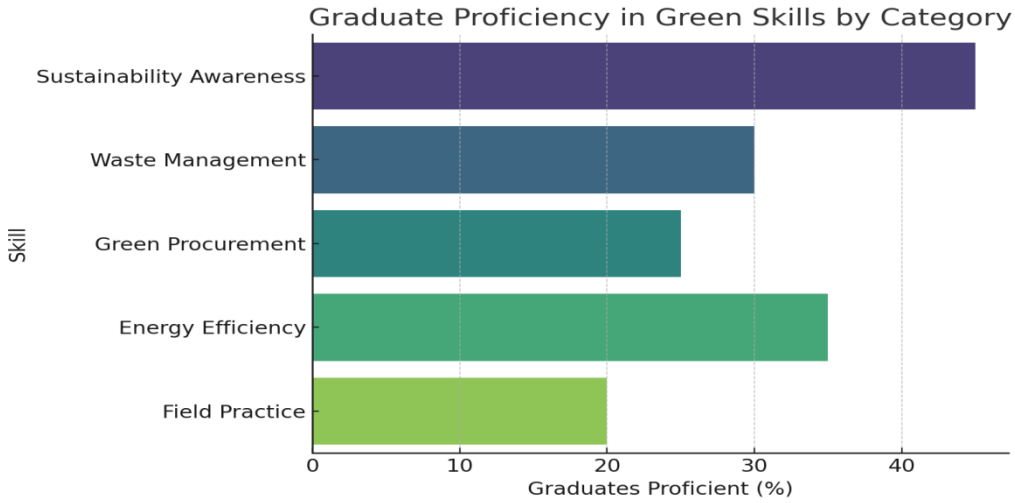


Figure 13: Graduate Proficiency in Green Skills by Category

Proficiency is highest in sustainability awareness (45%) but drops significantly for practical green competencies like waste management (30%), green procurement (25%), and field practice (20%). These findings suggest that environmental education needs to be more practically integrated into university curricula.

The green transition remains significantly under-addressed in most higher education programs. Employers across all sectors pointed to a critical gap in sustainability literacy among graduates. Although some basic awareness exists—particularly around waste

reduction or energy efficiency—there is minimal knowledge of applied green practices, such as sustainable procurement in healthcare, climate-conscious curriculum integration in education, or ESG compliance in Finance.

Industry stakeholders consistently call for universities to embed sustainability into both theoretical and practical training. Recommended strategies include integrating climate change, sustainable infrastructure, and environmental management into professional programs. Green internships and collaboration with environmentally responsible organizations are key to advancing practical sustainability education.

2.4.1.5 Summary of findings on green transition

The institutional self-assessment at the University of Education, Winneba (UEW) reveals a fragmented approach to sustainability integration. While some respondents acknowledged the presence of a sustainability strategy, most were unaware of its existence or uncertain about its implementation. Leadership engagement appears limited, with most participants disagreeing that university leadership actively promotes sustainability or allocates sufficient resources to green initiatives. Furthermore, sustainability themes are inconsistently embedded in academic programs, and there is a lack of courses specifically aimed at preparing students for green jobs, reflecting a disconnect between institutional goals and practical action.

Faculty responses suggest a foundational awareness of sustainability principles but limited expertise in more technical areas such as circular economy, biodiversity, and green technology. Challenges identified include inadequate training for educators, minimal interdisciplinary collaboration, and poor integration of sustainability into practical coursework. To strengthen their capacity to teach and apply green transition concepts effectively, faculty recommend targeted training, support for student-led initiatives, and the development of interdisciplinary sustainability modules in collaboration with industry and non-governmental organizations.

From the students' perspective, there is a clear desire for more practical exposure to sustainability topics. While students show greater confidence in digital skills, they feel underprepared for the green transition. Many expressed the need for hands-on learning experiences such as field projects, case studies, and closer collaboration with industry. They also reported that support from faculty varies and access to educational resources is only moderate. Students advocate for consistently integrating green and digital themes across curricula, including sustainability-focused modules and greater access to tools and labs that promote environmental innovation.

On the other hand, employers report low to moderate satisfaction with the sustainability competencies of graduates across sectors. While sectors like energy and healthcare show relatively better outcomes, industries such as Finance and media underscore serious deficiencies, particularly in applied knowledge such as ESG principles, green Finance, and sustainable media practices. Employers call for more substantial alignment between

university education and market needs, including integrating green principles in professional training, expanding green internships, and collaborating with environmentally responsible organizations to improve graduate readiness.

In conclusion, the green transition at UEW is still at an early and inconsistent stage of development. Despite policy-level intentions and growing awareness among faculty and students, the lack of strategic coherence, resource support, and real-world application undermines progress. Closing the gap between theory and practice will require comprehensive curriculum reform, faculty development, and stronger partnerships with industry to equip graduates with the sustainability competencies demanded by today's evolving job market.

2.4.1.6 Priority Measures to be taken by UEW to improve green transition (2025–2027)

1. Develop and Institutionalize a Formal Sustainability Strategy

- Although sustainability is cited in institutional documents, most respondents were unaware of a formal strategy. This suggests poor communication and a lack of institutionalization.
- UEW must establish a comprehensive sustainability policy framework, including clearly defined goals, implementation timelines, and performance indicators. This strategy must be widely disseminated and operationalized across all faculties and departments.

2. Allocate Dedicated Financial and Human Resources

- A significant gap exists between sustainability rhetoric and actual investment. Only 2 out of 30 respondents agreed that sustainability is well-resourced.
- UEW should allocate specific budget lines to sustainability projects, create a sustainability coordination unit, and appoint sustainability champions in every academic division.

3. Integrate Sustainability into Curricula and Pedagogy

- Sustainability is either missing or inconsistently addressed in academic programs. Most respondents felt students are not being adequately prepared for green careers.
- All programs should embed sustainability content relevant to their discipline. UEW should introduce interdisciplinary modules and collaborate with industry partners to ensure curricula align with real-world sustainability needs.

4. Build Faculty Capacity through Targeted Training

- Faculty members generally have basic awareness but lack confidence and technical competence in teaching green content.
- Mandatory training (professional development) programs should be implemented in sustainability education, renewable energy, and environmental technology.

Recognition and incentives for innovative green teaching practices should also be introduced.

5. Promote Experiential and Industry-Linked Student Learning

- Students expressed a strong demand for hands-on, real-world sustainability experiences. Employers reported low satisfaction with graduates' green skills.
- UEW should develop student-led sustainability projects, internships, and partnerships with environmental organizations. Green innovation labs and campus-wide sustainability campaigns can also enhance student engagement.

2.4.2 GOING DIGITAL: Embracing Technology for Innovation

2.4.2.1 University Self-Assessment Findings-Digital Transition

The digital transition in higher education involves the widespread adoption and integration of digital technologies into all facets of university operations, including teaching, Research, administration, and student engagement. At the University of Education, Winneba, survey data indicates a moderate to strong commitment to digital transformation. While institutional strategies and leadership support are in place, the levels of preparedness and implementation vary significantly among faculty members and students.

Digital transformation efforts at the University of Education, Winneba (UEW) appear even less mature than its sustainability initiatives. Survey results reveal significant infrastructure, strategy, and pedagogical integration shortcomings, indicating that digital innovation is not yet prioritized or institutionally supported. These observations are shown graphically in **Figure 14**.

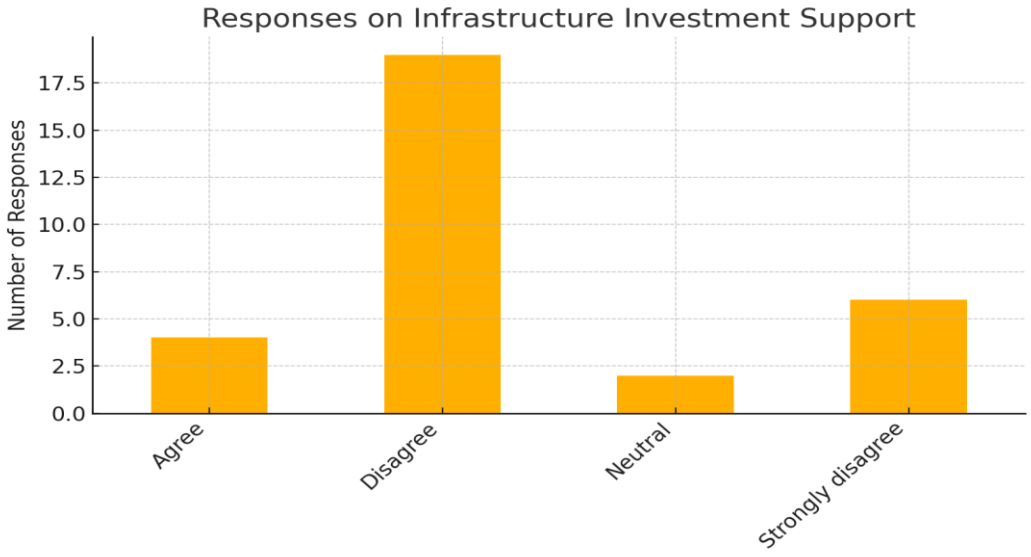


Figure 14: Responses on Infrastructure Investment Support

Digital Strategy

When asked about exploring and implementing eco-friendly digital technologies, most respondents again expressed disagreement, indicating minimal effort at the strategic level to drive digital sustainability. There appears to be no coherent policy or practice encouraging innovative use of digital solutions for environmental benefit.

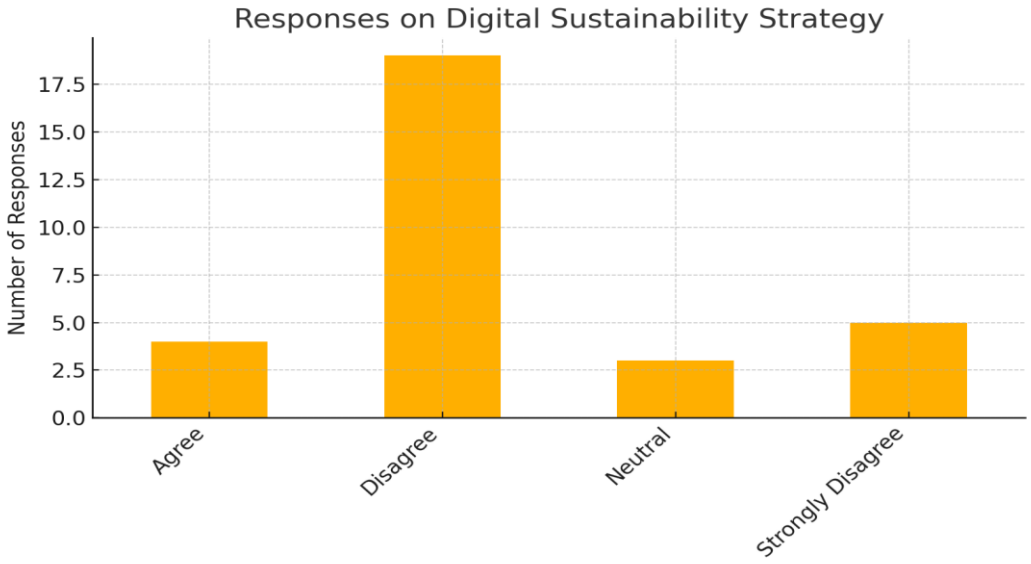


Figure 15: Responses on digital sustainability strategy

Most respondents disagreed or strongly disagreed that campus infrastructure supports digital integration, such as IoT or smart systems, as shown in Figure 15. This reflects a low level of foundational investment in digital infrastructure, severely limiting the university's readiness for transformation.

Curriculum and Practice

Few respondents as presented in in **Figure 16** indicated that students engage in real-world digital sustainability projects.

The lack of curricular emphasis on digital competencies suggests a limited institutional approach to equipping students and faculty for the digital era. UEW currently demonstrates low digital readiness, reflected in insufficient infrastructure, a lack of strategic focus, and minimal curricular integration; without a coordinated institutional effort to embrace digital technologies, particularly those aligned with sustainability, the university risks falling behind in preparing students and staff for the demands of a rapidly digitizing world.

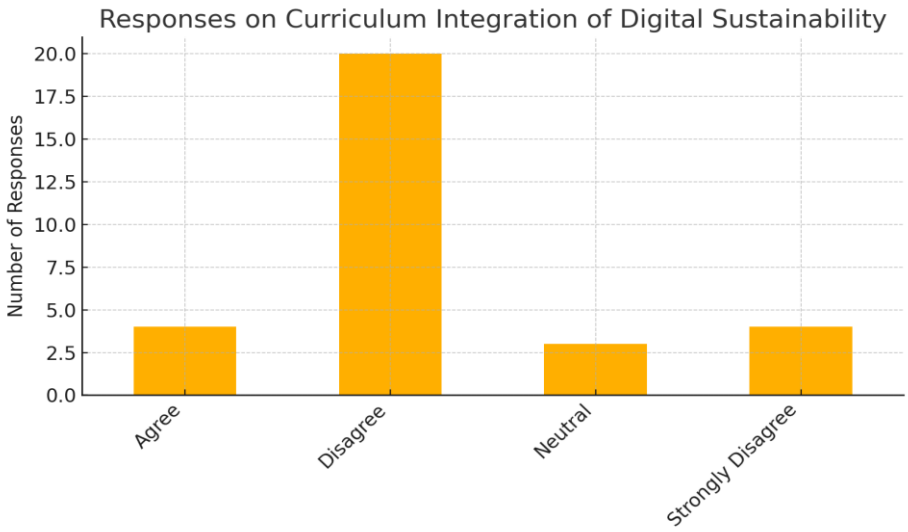


Figure 16: Responses on curriculum integration of digital sustainability

One key finding is that the institution has developed a formal digital strategy actively championed by leadership. This includes investments in infrastructure such as smart classrooms and improved internet connectivity. However, despite these advancements, disparities in access and usage remain a challenge. Faculty members demonstrate moderate confidence in using digital tools, with many proficient in learning management systems (LMS). Nevertheless, using more advanced technologies such as artificial intelligence and educational analytics tools remains limited. On the student side, while digital awareness is fairly high, many feel underprepared to apply these tools effectively in practical, real-world settings. Furthermore, digital collaboration platforms and open educational resources (OERs) are not fully utilized.

The survey responses on 'Digital Transition Readiness' reveal that the University of Education, Winneba, shows strong infrastructure and student readiness preparedness, indicating solid technological capacity and student engagement with digital tools. Teacher readiness and digital equity are moderate, suggesting progress but stressed on the need for consistent faculty training and equitable access across all user groups. However, curriculum integration lags behind, pointing to a critical gap in embedding digital competencies and tools into academic programs. This suggests that while foundational elements for digital transformation exist, deeper pedagogical integration and inclusive practices are needed to ensure a comprehensive digital shift.

Several challenges hinder the full realization of digital transformation. A prominent issue is the digital divide between staff and students, particularly regarding access to reliable devices and internet connectivity. Additionally, there is a lack of hands-on training opportunities for both educators and learners to build confidence in using emerging technologies. Another concern is the inconsistent integration of digital tools across the curriculum, which affects the overall learning experience.

The report recommends expanding professional development initiatives focusing on advanced digital tools and teaching strategies to address these issues. Ensuring equitable access to digital infrastructure for all staff and students is critical. Finally, there should be a greater emphasis on practical, technology-enhanced assignments that reflect real-world applications and foster deeper digital engagement across academic programs.

2.4.2.2 Teacher Self-Assessment Findings on Digital Transition

Faculty respondents demonstrate active use of digital tools, especially learning management systems and collaboration platforms.

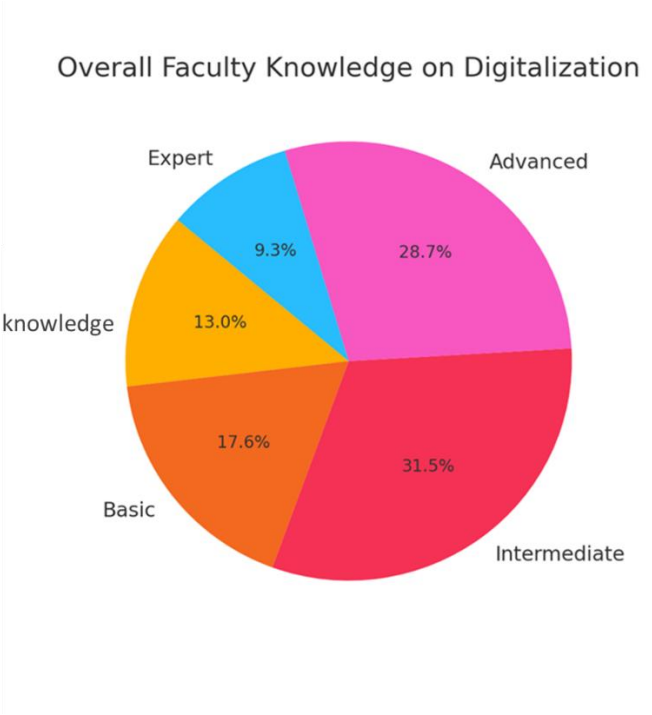


Figure 17: Overall Faculty Knowledge on Digitalization

However, familiarity with more complex digital concepts (e.g., AI in education and data privacy) varies considerably. **Figure 17** provides insights into faculty members' self-assessed digital proficiency levels. The largest segment, representing 31.5%, falls within the intermediate category, indicating that many faculty are comfortable with standard digital tools and platforms, though they may not yet possess advanced technical skills. Close behind, 28.7% of faculty identify their knowledge as advanced, suggesting they can use more complex digital systems and may serve as early adopters or champions within their departments.

Meanwhile, 17.6% of faculty rate their skills as basic, reflecting only introductory understanding and limited confidence in digital environments. Notably, 13.0% of respondents reported having no knowledge of digitalization, which underscores the digital divide and points to the urgent need for foundational training and support. Finally, only 9.3% consider

themselves experts, pointing to a gap in high-level digital leadership and mentorship within the institution.

These findings suggest that while a majority of faculty members possess moderate to strong digital competencies, the relatively small number of expert users and the persistent presence of low-knowledge groups emphasize the need for comprehensive, tiered professional development programs. By addressing foundational gaps and fostering advanced digital leadership, institutions can strengthen their readiness for digital transformation in teaching, Research, and administration.

2.4.2.3 Findings from Students – Digital Transition

The survey data examines the capacity of the University of Education, Winneba (UEW), to adopt and implement digital tools and technologies in education using data collected from students. The analysis shows students' familiarity with digital concepts, satisfaction with current initiatives, perceived preparedness, and areas requiring attention for effective twin transition (digital and green).

A majority of students rated themselves as moderately or slightly familiar with the concept of twin transition. However, a small portion indicated no familiarity, showing a knowledge gap among some groups, particularly at the undergraduate level. Despite this, over 85% of students believed their education adequately prepares them for digital transformation, though there is a noticeable emphasis on digital rather than green transition, indicating a curriculum imbalance.

While some students expressed satisfaction with digital-related course content, others found it only moderately engaging. A minority reported being very satisfied, while several noted gaps, such as limited practical exposure and real-world application. Students consistently ranked project management and leadership, communication and collaboration, and digital literacy as the most critical skills for the future. However, requests for more digital literacy education suggest inconsistent delivery or depth of current offerings.

Students noted that available resources, including online tools and workshops, were either just enough or more than enough. Despite this, many felt that the integration of twin transition topics across departments occurred only to some extent, indicating a lack of a cohesive interdisciplinary approach. There was a unanimous call for increased industry collaboration, with students recommending partnerships with tech companies, innovation labs, and the inclusion of case-based assignments.

The survey data identifies several strengths: general awareness of digital concepts, institutional provision of basic learning tools, student willingness to engage with digital content, and supportive faculty. However, challenges remain. Low digital familiarity among some students, limited interdisciplinary course integration, and inadequate exposure to practical applications underscore the need for structured reforms.

2.4.2.4 Findings from Employer Interviews - Digital Transition

Stakeholders were surveyed on four key aspects of digital transformation: strategy, leadership, mission alignment, and funding (as shown in **Figure 18**), revealing varying levels of institutional readiness and commitment.

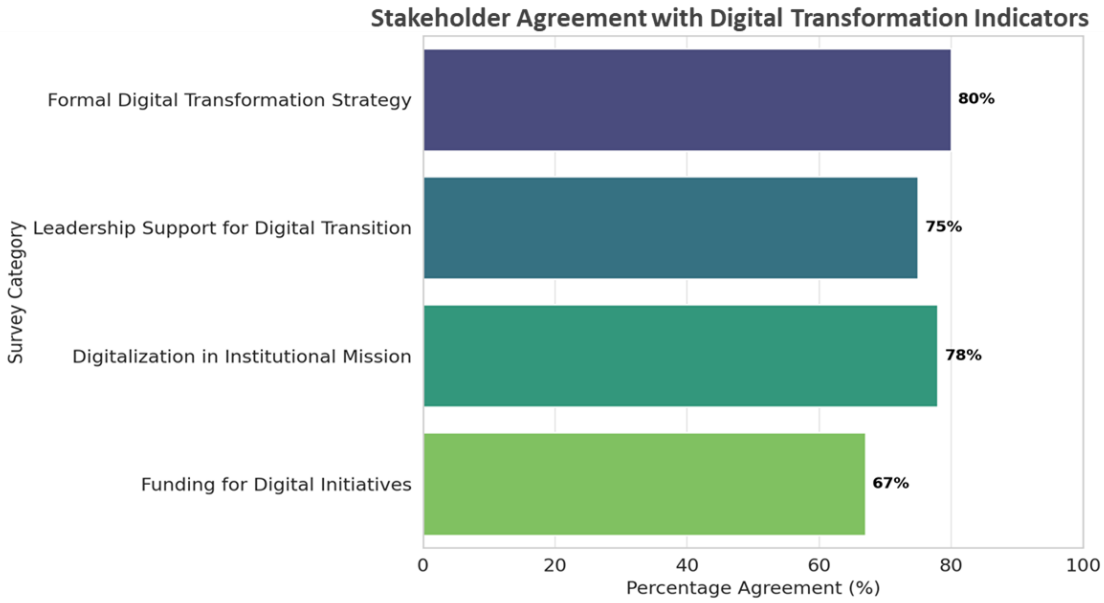


Figure 18: Stakeholder agreement with digital transformation indicators

Most stakeholders recognize strong institutional strategies (80%), mission alignment (78%), and leadership support (75%) for digital transformation, but there is a noticeable gap in funding (67%), which may hinder full implementation. The data suggests that while vision and leadership are in place, inadequate funding poses a major risk to translating strategic plans into actionable and sustainable digital outcomes. To bridge the strategy-funding gap, institutions should align investments with strategic goals, develop fundable digital action plans, increase transparency in digital spending, and establish a task force to guide and monitor transformation efforts.

The digital transition in education is imperative for preparing students and graduates for a rapidly evolving technological landscape. Based on employer interviews conducted across sectors including healthcare, education, Finance, and public governance, a significant digital skills gap was observed among graduates. Employers emphasized the need for proficiency in domain-specific digital tools such as Electronic Health Records (EHRs), e-learning platforms, AI-driven diagnostics, and digital content creation tools. Despite general familiarity with basic ICT tools, many graduates lack advanced digital competencies, including data analytics, Cybersecurity, and application of AI in sector-specific contexts; thus, **Figure 19** illustrates key challenges identified in graduate readiness. Institutions are encouraged to integrate hands-

on training, real-world digital internships, and co-designed digital literacy programs with industry.

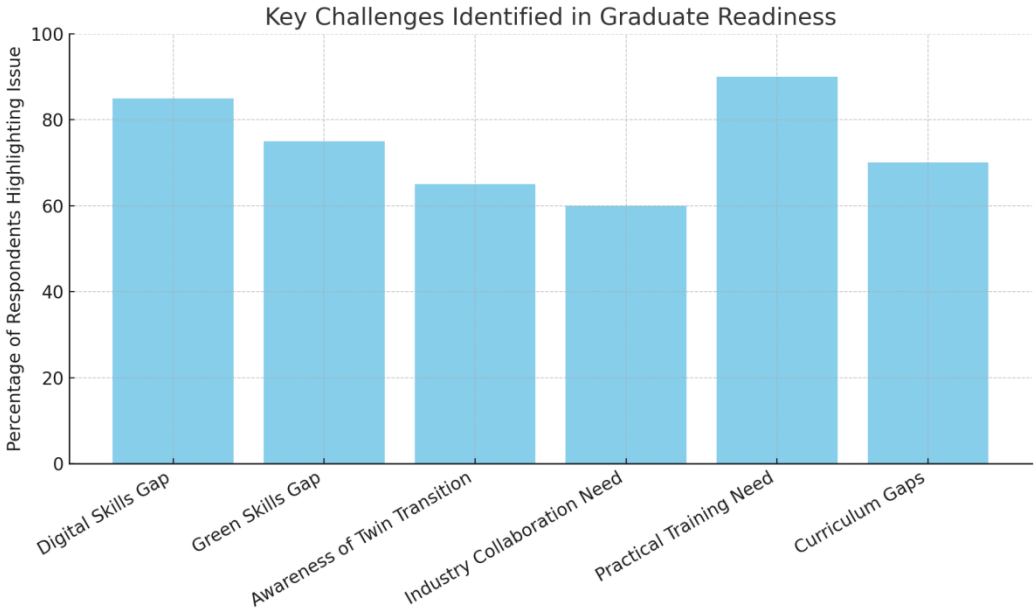


Figure 19: Key challenges identified in graduate readiness

Graduate Proficiency in Digital Skills by Category

The chart ' Distribution of skill deficiencies reported by Employers' (as shown in **Figure 20**) visualizes graduates' proficiency levels in various digital skill areas based on employer feedback across healthcare, banking, education, and energy sectors. While basic ICT skills see relatively high proficiency (60%), there are significant gaps in advanced digital tools (35%), AI use (20%), and Cybersecurity (15%). Industry-specific digital tool proficiency is 40%, indicating a need for targeted digital skills training in higher education.

The bar chart (as shown in **Figure 21**) illustrates varying levels of digital competency among graduates across five skill areas. The highest proficiency is observed in Basic ICT, with nearly 60% of graduates demonstrating competence in general computer use and foundational digital tools. This is followed by Industry-Specific Tools at 40%, suggesting moderate alignment between academic training and sector-specific digital requirements. Advanced Tools—such as data analytics or software for design and engineering—show 35% proficiency. In comparison, only 20% of graduates are proficient in AI Use, and a mere 15% in Cybersecurity, reflecting significant skill gaps in emerging and critical technology domains. These results indicate that while foundational digital literacy is strong, there is a pressing need to enhance advanced and specialized digital competencies to meet evolving labour market demands.

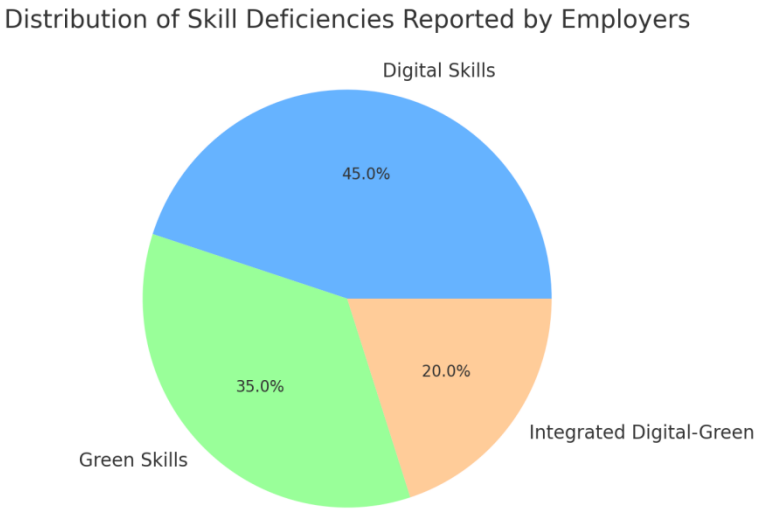


Figure 20: Distribution of skill deficiencies reported by Employers

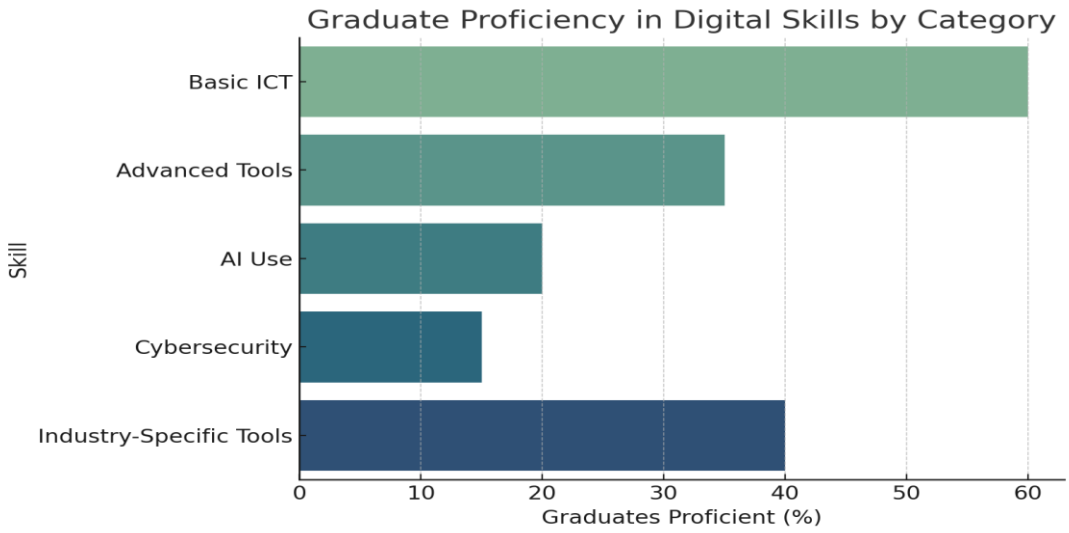


Figure 21: Graduate Proficiency in Digital Skills by Category

Graduate Digital Readiness by Sector

Figure 22 presents a comparative analysis of graduates' digital skills across six key industries: Healthcare, Education, Finance, Energy, Media, and Hospitality. It points to two tiers of competencies: basic digital skills (such as word processing, email, or basic software use) and advanced digital skills (including AI tools, data analytics, and sector-specific digital platforms). Among the sectors, Media stands out with the highest overall digital readiness, combining 90% basic and 50% advanced skills. This reflects the strong integration of digital tools and platforms in modern media environments. Healthcare and Finance follow closely, indicating solid foundational digital training but still needing more advanced, role-specific digital skills.

In contrast, Education and Hospitality demonstrate lower levels of advanced digital preparedness. While many graduates in these sectors are familiar with basic digital tools, few are proficient in using advanced technologies such as learning management systems (LMS), digital assessment platforms, or restaurant management software. Despite being a technologically driven field, energy shows only moderate readiness, suggests the responses. This emphasizes the urgent need for higher education institutions to enhance their curricula with practical, industry-aligned digital training to prepare graduates for the evolving workplace demands.

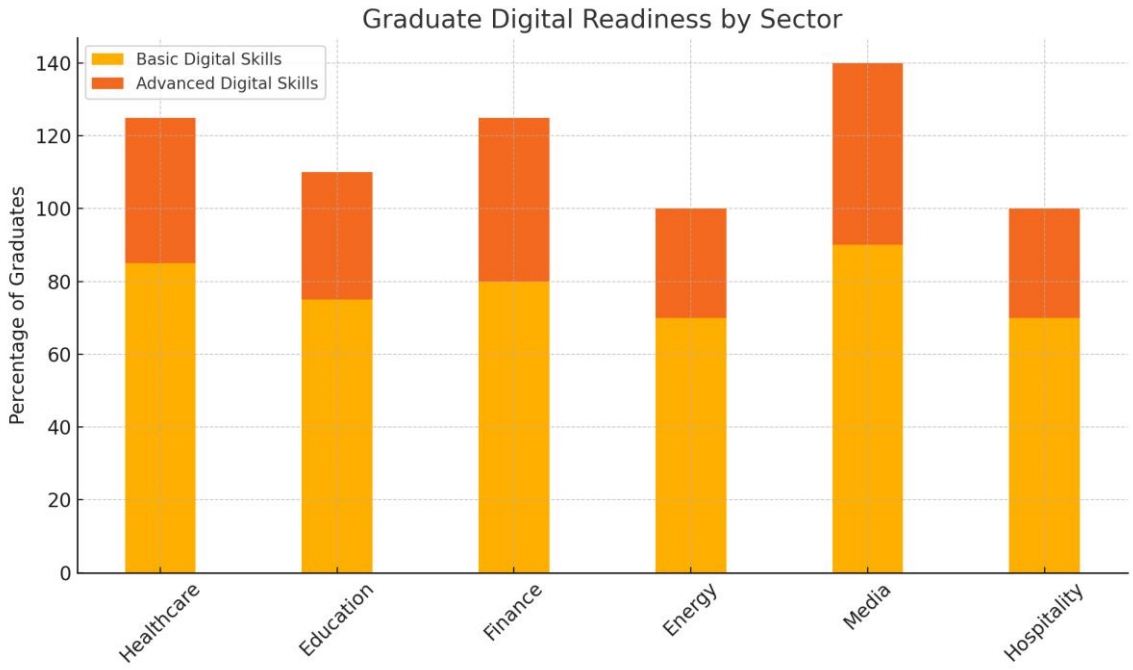


Figure 22: Graduate Digital Readiness by Sector

The digital transition within higher education is well underway, yet its implementation is uneven across disciplines and sectors. Graduates generally possess basic digital literacy, particularly in word processing, online teaching tools, and electronic health or education platforms. However, there is a notable deficiency in advanced digital skills such as AI-assisted diagnostics, data analytics, Cybersecurity, smart grid technologies, and digital content creation across sectors from healthcare to hospitality and education.

From interviews conducted across diverse sectors, employers noted a widespread need for universities to enhance practical digital training. Graduates are often underprepared to use specialized software like SCADA in energy systems, AI tools in education and journalism, or fintech platforms in banking. The digital transition must, therefore, include structured upskilling initiatives, such as simulation-based training, hackathons, and mandatory hands-on internships. Partnerships with industry to co-create digital curricula are essential for real-world relevance.

2.4.2.5 Summary of findings on digital transition

The University of Education, Winneba (UEW) has shown a moderate to strong institutional commitment to digital transformation, underpinned by the development of formal strategies and visible leadership support. However, the actual implementation of digital initiatives is uneven across departments, with varying levels of preparedness and engagement among faculty and students. While some efforts have been made to upgrade infrastructure—such as installing smart classrooms and improving internet access—significant challenges remain, particularly around digital tools' availability and equitable Distribution.

A major finding from the self-assessment is that UEW lacks the foundational digital infrastructure necessary to integrate emerging technologies fully. Many respondents expressed dissatisfaction with the institution's capacity to support digital integration, especially in areas like the Internet of Things (IoT) and smart systems. This infrastructure gap has created a digital divide, limiting staff and students' access to essential devices and reliable connectivity. Additionally, funding constraints were identified as a major barrier, with misalignment between strategic goals and resource allocation.

Regarding curriculum and faculty readiness, the responses emphasize that while many educators are comfortable using basic digital tools such as learning management systems (LMS) and collaboration platforms, they are limitedly familiar with more complex digital technologies. Faculty members often lack confidence or training in artificial intelligence, data analytics, and Cybersecurity. Therefore, the need for targeted professional development programs focusing on advanced digital tools and their integration into pedagogy is urgent.

On the other hand, students generally demonstrate a good level of awareness regarding digital technologies but report feeling underprepared to use these tools in practical settings. There is a strong demand among students for more hands-on experiences, such as real-world digital projects, internships, and interactive assignments. Despite the growing digital culture, the utilization of open educational resources (OERs) and digital collaboration tools remains low, signalling an opportunity for greater institutional promotion and integration.

Employer interviews reinforce the gap between university training and labour market demands. While graduates tend to have foundational digital literacy, they often lack the advanced, job-specific digital competencies required in media, Finance, education, healthcare, energy, and hospitality sectors. The media sector reported the highest readiness due to its strong reliance on digital tools. At the same time, education and hospitality lag behind, especially in using advanced learning and management platforms.

Overall, the digital transition at UEW is underway but hampered by infrastructure limitations, inconsistent curricular integration, and inadequate training. To move forward effectively, the institution must align its funding priorities with its strategic digital goals, ensure equitable access to digital infrastructure, and build faculty and student capacity through practical, real-world digital learning opportunities. Collaboration with industry partners is also critical for co-developing curricula aligned with evolving technological demands.

2.4.2.6 Priority Measures to be taken to Improve Digital Transition (2025–2027)

1. Invest in Equitable and Scalable Digital Infrastructure

- Survey findings indicate that digital infrastructure is insufficient, with many staff and students lacking access to smart tools, internet connectivity, and digital labs.
- UEW must prioritize the deployment of reliable internet, modern teaching technologies, and smart classroom setups across all campuses. A digital equity initiative should be launched to ensure all students and faculty can access essential digital resources.

2. Expand Digital Skills Training for Faculty and Students

- While learning management systems are widely used, familiarity with emerging tools such as artificial intelligence and educational analytics remains low.
- Professional development programs must target both foundational and advanced digital competencies. For students, UEW should integrate hands-on training, certification programs, and digital literacy courses that are aligned with real-world tools and applications.

3. Integrate Advanced Digital Technologies into Curriculum Design

- Integrating advanced tools like AI, data analytics, and simulation technologies into coursework is still inconsistent.
- UEW should revise curriculum across disciplines to embed these technologies in both content and assessment methods. Assignments should emphasize real-world problem-solving using digital platforms, encouraging innovation and digital fluency.

4. Strengthen Industry Partnerships and Digital Internships

- Employer feedback reveals a gap between graduate skills and industry needs, especially in healthcare, Finance, and media sectors.
- UEW should co-develop digital training programs with industry partners and establish internship pipelines, allowing students to gain practical experience with specialized tools and technologies in various professional fields.

5. Establish a Digital Innovation Task Force and Monitor Implementation

- Despite strategic vision and leadership, there is limited funding and inconsistent implementation of digital plans.
- UEW must form a task force to oversee digital transformation, align investments with goals, and monitor progress through annual reviews. This body should ensure that all faculties adhere to strategic objectives and that resources are distributed equitably.

2.4.3 TWIN TRANSITION: Integrating Digital and Green for Future Education

2.4.3.1 University Self-Assessment Findings on Twin Transition

Based on participants' feedback, the concept of a twin transition—integrating digital and green strategies—remains underdeveloped at the institution. Many respondents disagreed or strongly disagreed with statements about cross-disciplinary collaboration to address twin transition challenges.

Collaboration Across Disciplines

The "Collaboration Across Disciplines" (as shown in **Figure 23**) reveals a significant concern regarding interdisciplinary engagement within the institution. A majority of respondents—21 individuals—disagreed with the statement that there is collaboration across disciplines, indicating a strong perception that academic departments largely operate in isolation. Only a few respondents agreed, remained neutral, or strongly disagreed, each category receiving just 3 to 4 responses.

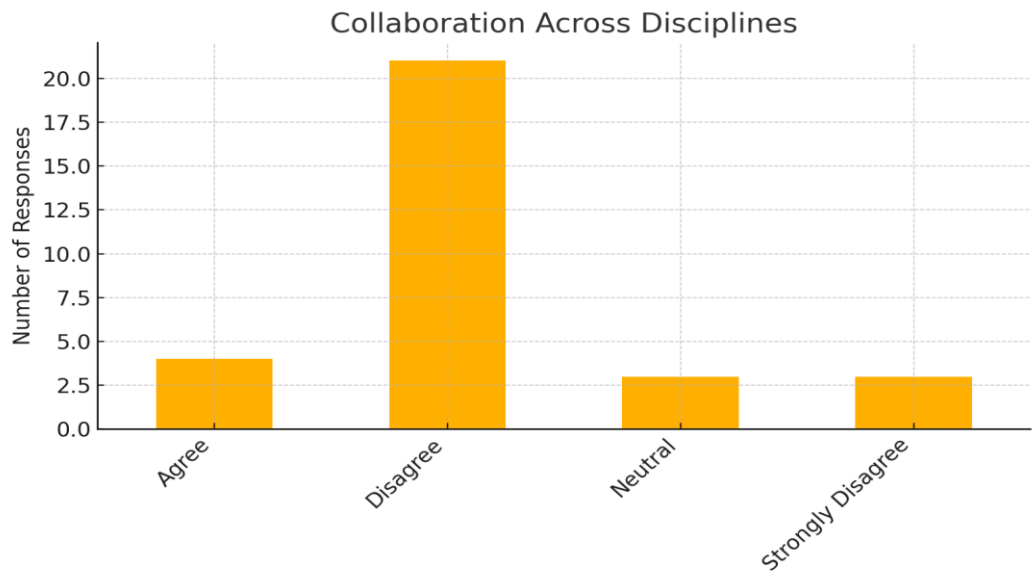


Figure 23: Collaboration Across Disciplines

This suggests that cross-disciplinary interaction is either minimal or poorly facilitated. Such a lack of collaboration may limit the institution's ability to address complex, multifaceted challenges that require integrated perspectives, particularly in sustainability, digital transformation, and innovation. Addressing this issue may require structural changes, leadership support, and new incentives to encourage joint projects, interdisciplinary teaching, and shared research agendas.

Stakeholder Involvement

There was an apparent lack of stakeholder engagement (staff, students, partners) in twin transition initiatives. **Figure 24** presents responses regarding the extent to which stakeholders are involved in implementing the twin transition—integrating digital and green transformation—in an institution.

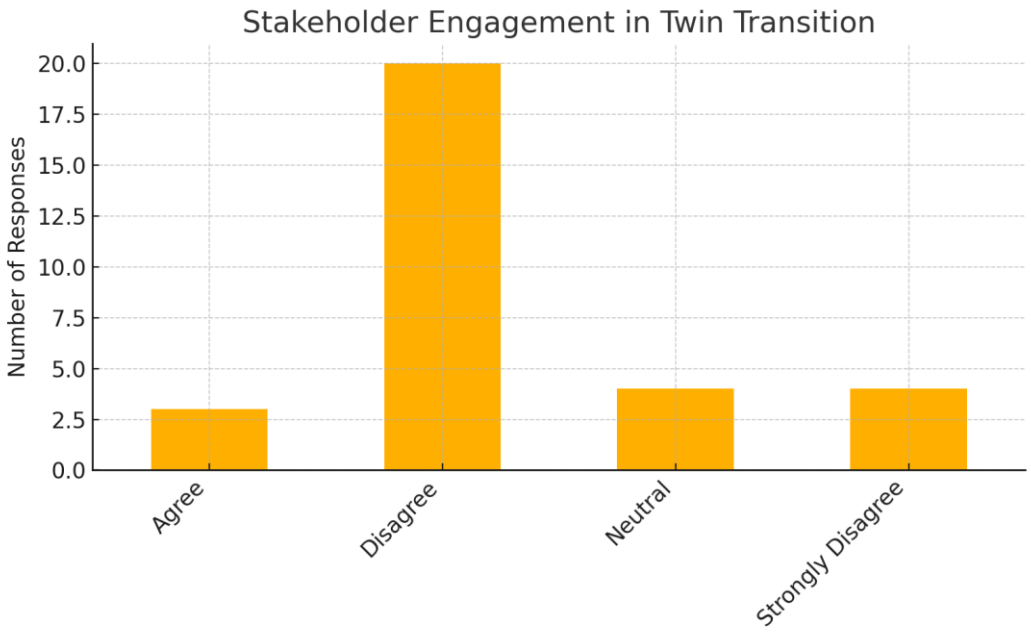


Figure 24: Stakeholder Engagement in Twin Transition

A majority of respondents, totaling 20, selected Disagree, indicating that stakeholders such as students, faculty, industry partners, and community members are perceived to be largely excluded from relevant decision-making and implementation processes. In contrast, very few respondents selected Agree or Strongly Disagree (around 3 each), and only a small number remained Neutral, further highlighting a broad consensus on the lack of effective engagement.

This pattern reveals a critical gap in inclusive governance and participatory planning, essential for a successful twin transition. Without meaningful stakeholder involvement, the design and impact of sustainability and digital initiatives may fall short of institutional and societal needs. Strengthening collaboration and co-creation with internal and external stakeholders will ensure relevance, buy-in, and long-term success of the twin transition agenda.

Student Engagement in Twin Transition Projects

Very few participants reported student involvement in real-world twin transition projects, such as digital solutions for sustainability. **Figure 25** presents responses regarding student involvement in initiatives combining digital and green transformation.

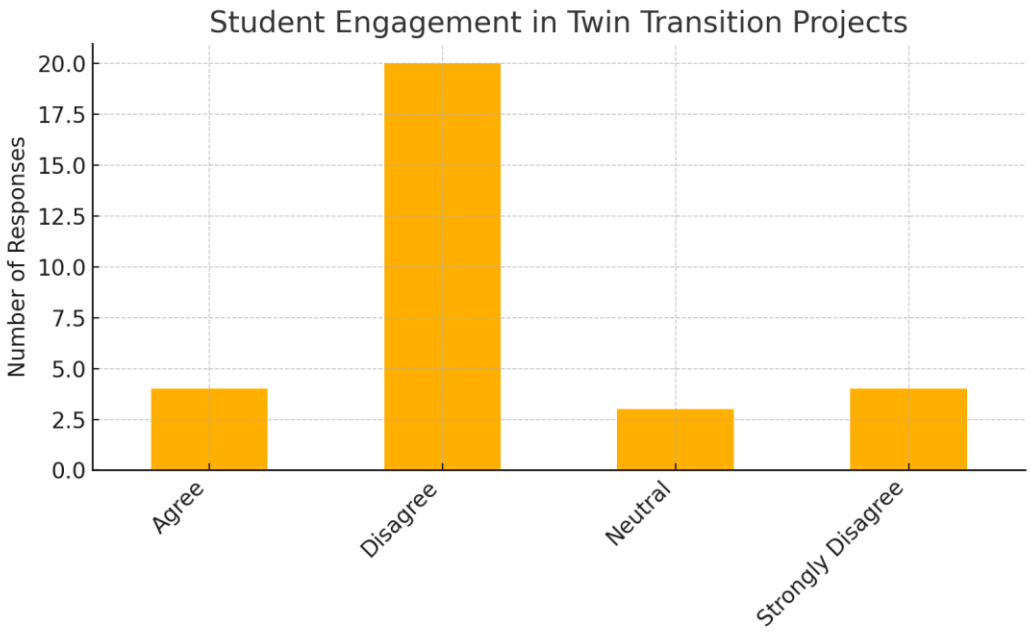


Figure 25: Student Engagement in Twin Transition Projects

The data show that the majority, 20/31 respondents, disagreed with the statement, suggesting that students are primarily not engaged in such projects. Only a few participants agreed or strongly disagreed (around 4 each), while a small number remained neutral. This overwhelming disagreement indicates a significant gap in experiential learning opportunities related to the twin transition. Despite growing institutional interest in sustainability and digital innovation, students are not actively involved in real-world or cross-disciplinary projects that would equip them with relevant, future-oriented skills. Addressing this disconnect could enhance both learning outcomes and institutional impact.

Evaluation and Monitoring

Most responses indicated no measurable indicators or regular reviews to assess twin transition progress. **Figure 26** shows an apparent concern about the lack of metrics to track progress in institutional initiatives, particularly in digital or green transition areas.

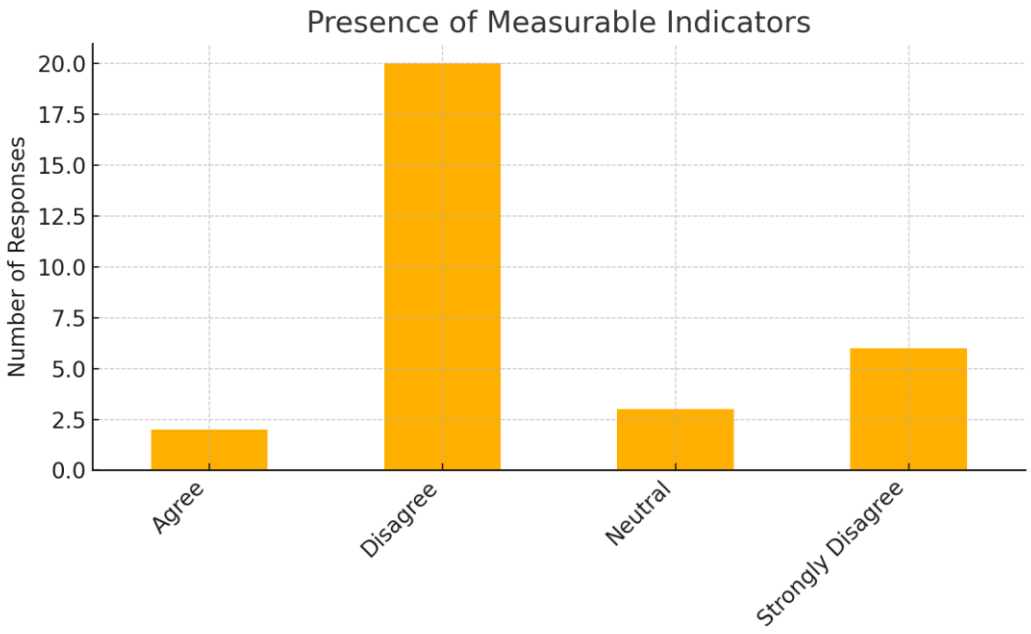


Figure 26: Presence of Measurable Indicators

A substantial majority of respondents, 20 individuals—disagreed with the statement that measurable indicators are in place. In contrast, 6 strongly disagreed, reinforcing the perception that monitoring and evaluation systems are either weak or non-existent. Only 2 respondents agreed, and 3 remained neutral, underscoring a widespread absence of strategic tools to assess outcomes and guide continuous improvement. This indicates a critical institutional gap, as the absence of measurable indicators undermines accountability, transparency, and evidence-based decision-making in transformation processes.

Review and Use of Twin Transition Outcomes

Feedback systems and strategic evaluation mechanisms are also missing. **Figure 27** indicates a widespread perception that outcomes related to the integration of digital and green transformation are not being systematically reviewed or applied within the institution. A significant majority of respondents, 20, selected Disagree, while another 7 chose Strongly Disagree, emphasizing a lack of follow-through in assessing the impact of twin transition initiatives. Only 2 respondents agreed with the statement, and another 2 remained neutral. This suggests a critical gap in institutional learning and feedback mechanisms, where data or results from transition efforts are either not collected, analysed, or used to inform future planning. Without such review processes, the institution risks stagnation and missed opportunities for continuous improvement and accountability in sustainability and digital innovation.

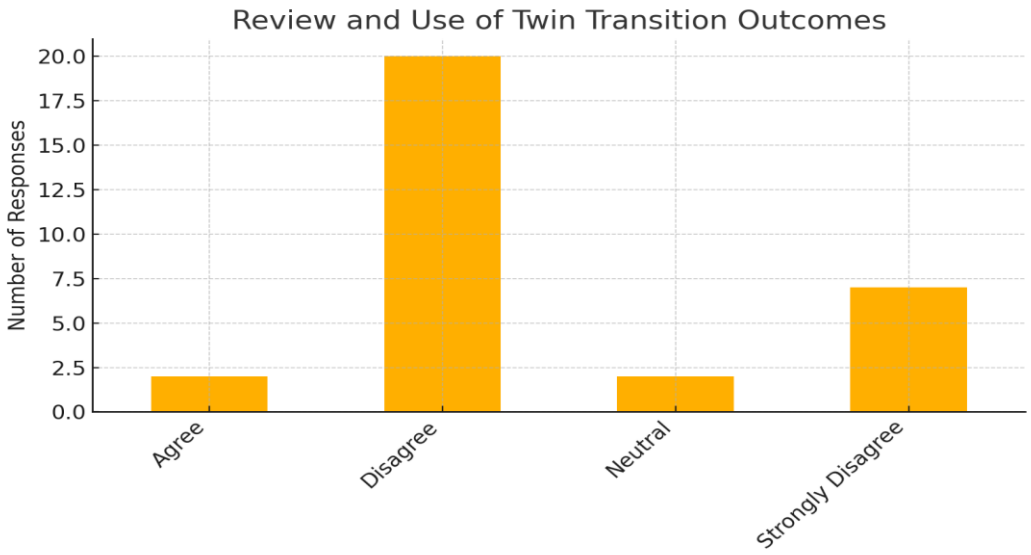


Figure 27: Review and Use of Twin Transition Outcomes

The "Feedback Mechanisms on Twin Transition" (as shown in **Figure 28**) reveals a significant deficiency in the presence or effectiveness of feedback systems related to digital and green transformation efforts within the institution. A large majority (18 out of 31) of respondents selected Disagree, suggesting that mechanisms to collect, process, or act on feedback about twin transition initiatives are either absent or ineffective. An additional 7 respondents chose Strongly Disagree, reinforcing this concern. Meanwhile, 5 were Neutral, and only 1 agreed that such feedback mechanisms exist. This pattern points to a critical gap in participatory governance and continuous improvement, where the lack of feedback loops hinders institutional learning, stakeholder engagement, and the ability to adapt or scale twin transition strategies effectively.

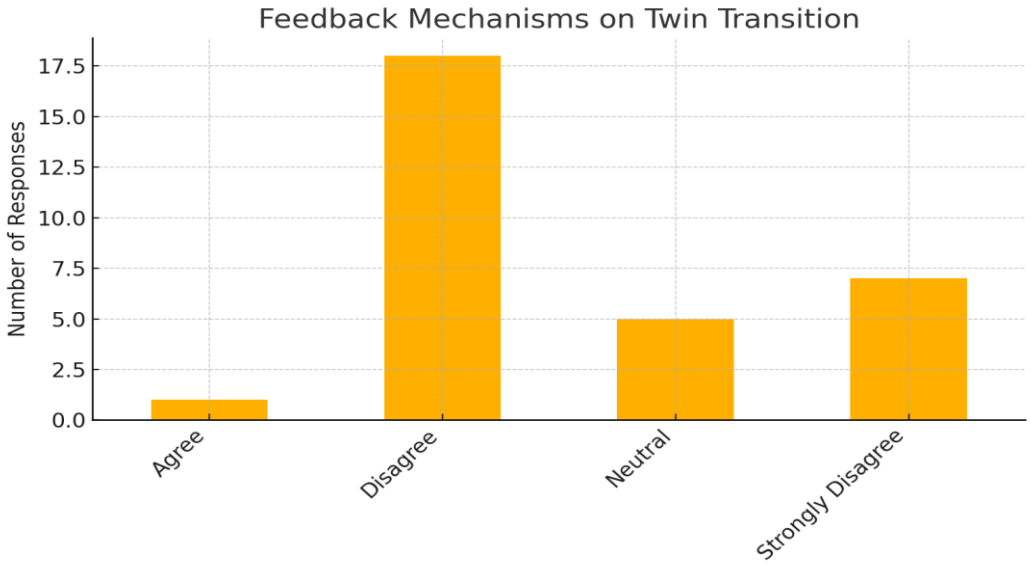


Figure 28: Feedback Mechanisms on Twin Transition

Evaluation of Synergies and Trade-offs

Figure 29 indicates a major institutional shortfall in assessing the interconnected benefits and compromises involved in implementing digital and green transitions.

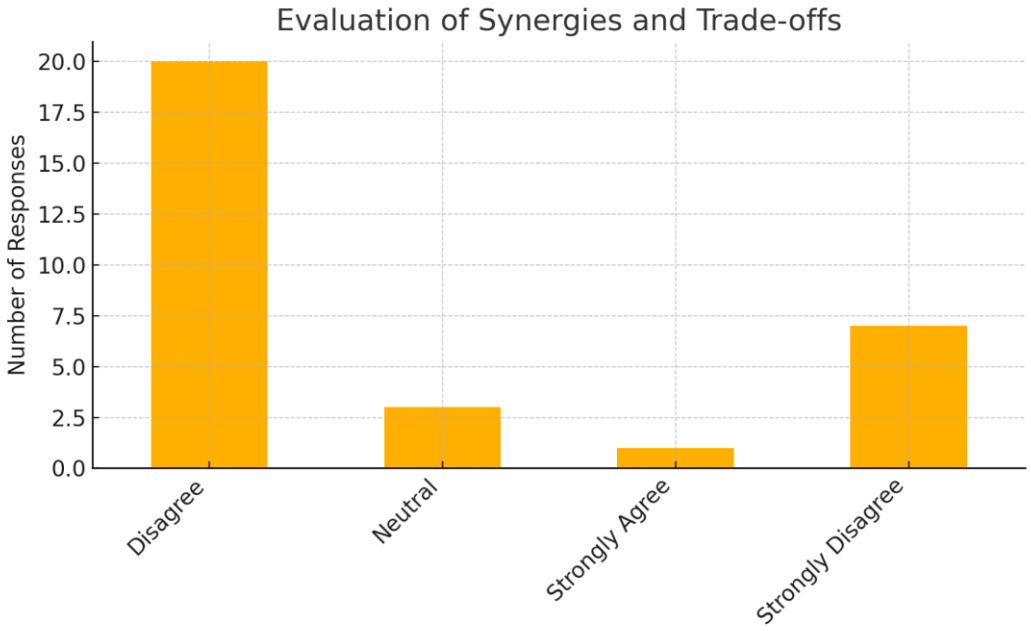


Figure 29: Evaluation of Synergies and Trade-offs

A substantial majority, 20 respondents disagreed that such evaluations are taking place. In contrast, an additional 7 strongly disagreed, suggesting that the institution lacks structured mechanisms to analyse how digital and sustainability goals align or conflict. Only 1 respondent strongly agreed, and 3 were neutral, reflecting widespread uncertainty or dissatisfaction. This absence of strategic reflection on synergies and trade-offs may result in inefficient resource use, missed opportunities for integration, and conflicting priorities that hinder the overall success of the twin transition agenda.

Open-Ended Feedback

Many respondents expressed scepticism or acknowledged that no active measures are in place to integrate digital and green strategies. Some were unsure or unaware of any initiatives.

The twin transition is mainly aspirational rather than operational at the university. Without a formal strategy, institutional accountability, and cross-sectoral collaboration, digital and green transformation integration remains limited. The institution is currently in the early stages of green and digital transformation and lacks a cohesive framework to integrate these two critical areas effectively. This foundational gap hinders the institution's ability to harness

the twin transition's full potential and respond proactively to global trends in education and sustainability.

To move forward, strategic planning, capacity-building, and active stakeholder engagement must be prioritized. A clear institutional roadmap and the development of internal competencies and collaborative networks will be essential in laying the groundwork for meaningful progress.

Furthermore, establishing robust monitoring and evaluation systems is vital. These systems should be designed to track outcomes, guide decision-making, and ensure accountability. Piloting cross-disciplinary student projects that merge digital innovation with sustainability goals can also offer practical avenues for experiential learning and institutional innovation.

Finally, the institution must leverage external partnerships while investing in infrastructure and human capital. Such investments will strengthen its operational capacity and increase its impact in promoting sustainability and digital transformation across its academic and administrative spheres.

2.4.3.2 Teacher Self-Assessment Findings on Twin Transition

This section presents a visual summary of faculty self-assessment data from the University of Education, Winneba (UEW), focusing on three key areas: green transition, digital transformation, and the integrated twin transition.

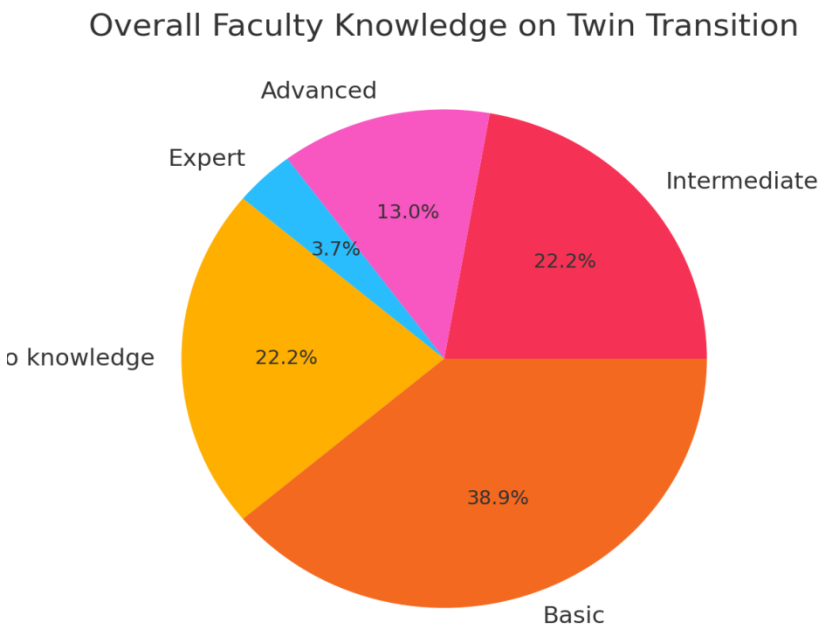


Figure 30: Overall Faculty Knowledge on Twin Transition

Figure 30 illustrates the Distribution of faculty knowledge and awareness levels across these domains. The twin transition remains a conceptual aspiration rather than an institutional reality. Faculty awareness of the interconnection between sustainability and digital transformation is growing, but the adoption of integrated pedagogical approaches is limited. Figure 30 reveals that most faculty at the institution have limited familiarity with integrating digitalization and sustainability. The most significant proportion, 38.9%, reported having only basic knowledge, while an equal 22.2% each indicated either intermediate understanding or no knowledge at all—highlighting a considerable need for foundational awareness and upskilling. Only 13.0% of faculty identified as advanced in their understanding, and a minimal 3.7% as experts, underscoring a substantial gap in institutional capacity to support and lead twin transition efforts. This Distribution suggests an urgent need for targeted faculty development programs to build competence in integrating green and digital strategies across teaching and Research.

Twin Transition Readiness Matrix

Figure 31 assesses the institutional preparedness of six key components related to integrating green and digital transformation in higher education. Based on current performance and readiness, the evaluation framework categorizes each component into one of three levels—Low, Medium, or High.

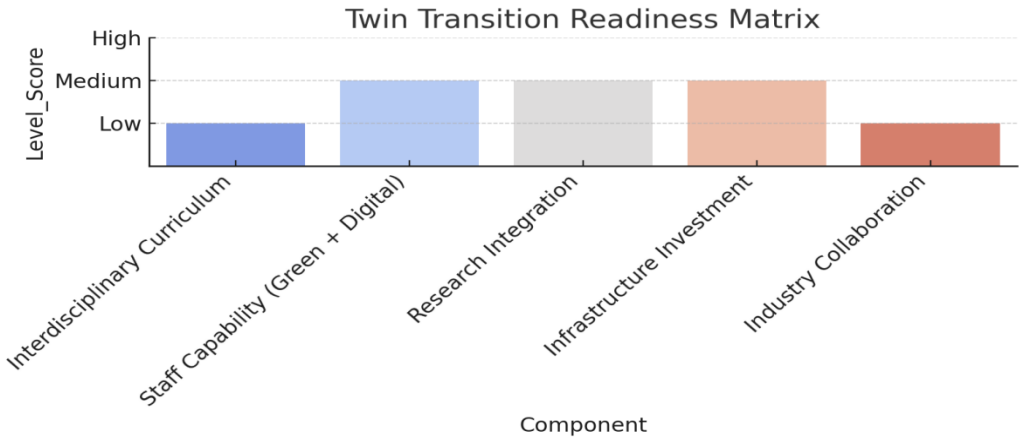


Figure 31: Twin Transition Readiness Matrix

The results reveal that both Interdisciplinary Curriculum and Industry Collaboration are rated low. This indicates significant gaps in embedding twin transition concepts across academic programs and a lack of structured engagement with external stakeholders such as industry, government, and civil society. The absence of interdisciplinary teaching and weak industry linkages limit the institution's ability to offer practical, future-oriented training aligned with evolving sustainability and digital demands.

Meanwhile, Staff Capability (Green + Digital) and Infrastructure Investment are rated Medium, reflecting progress in building faculty competencies and improving technological infrastructure. However, these areas still require deliberate and expanded efforts, particularly in professional development for faculty and equitable access to digital tools across all departments and campuses.

Research Integration also scores at the medium level, suggesting that while some academic inquiry may touch on digital and sustainability themes, the work is likely fragmented and not systematically prioritized. Without coordinated strategies for interdisciplinary and applied Research, the institution risks missing opportunities to drive innovation and influence policy on the twin transition.

Overall, the matrix underscores that while a foundation for the twin transition exists, transformative progress is being hindered by institutional silos, limited external collaboration, and underdeveloped curriculum strategies. The university must adopt a whole-of-institution approach, with focused investments in curriculum reform, faculty upskilling, and stakeholder engagement to move forward.

In the green transition, most faculty members report a basic to intermediate understanding of sustainability topics such as climate change, renewable energy, biodiversity, and the circular economy. A smaller proportion demonstrate advanced or expert knowledge, indicating a need for capacity-building in environmental education.

For the digital transition, faculty show stronger familiarity, especially with digital tools for teaching, assessment, and blended learning. However, expertise in more advanced areas like AI, data analytics, and Cybersecurity remains limited, suggesting targeted training is essential to close these gaps.

The twin transition, which integrates green and digital practices, is the least developed area. Faculty primarily report only a basic to intermediate understanding of how digital tools can support sustainability and how to embed these concepts jointly in curriculum and pedagogy.

Overall, the report reveals growing awareness but an uneven depth of knowledge across all three areas. It calls for institutional strategies that promote interdisciplinary training, curriculum reform, and external partnerships to strengthen faculty engagement and leadership in sustainability and digital innovation.

2.4.3.3 Student Self-Assessment Findings

Survey responses were relatively evenly distributed, as shown in **Figure 32**. This indicates broad institutional engagement across the categories.

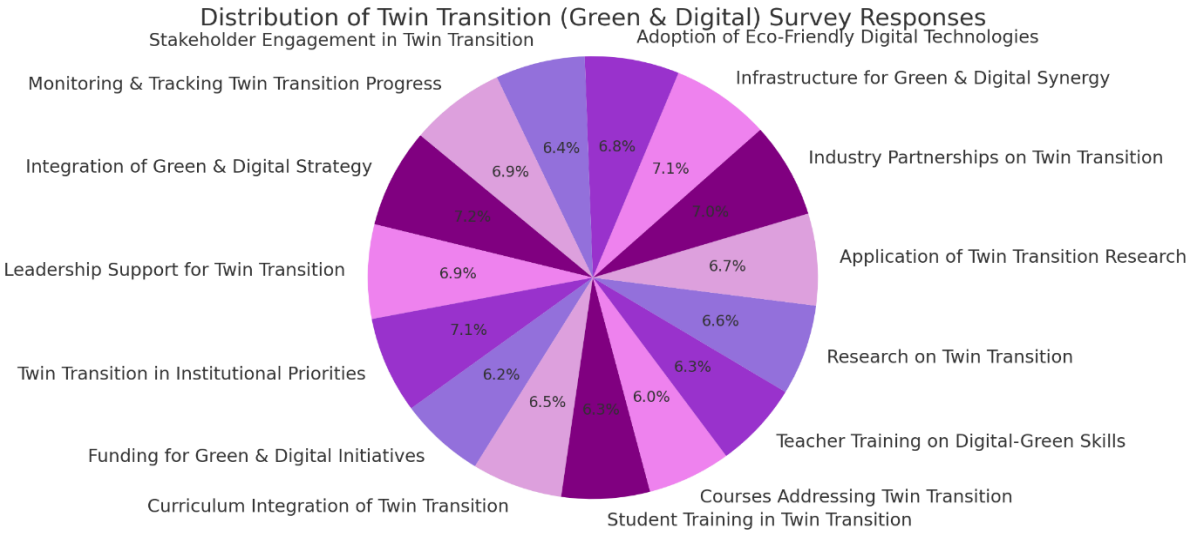


Figure 32: Distribution of Twin Transition (Green & Digital) Survey Responses

Top-rated dimensions include Integration of Green and Digital Strategy (7.2%), Infrastructure for Green and Digital Synergy (7.1%), and Twin Transition in Institutional Priorities (7.1%), indicative of a strong strategic and infrastructural base. Conversely, areas such as Research (6.6%), Teacher Training (6.3%), and Student Training (6.0%) were slightly lower, indicating less emphasis or slower progress in capacity-building and academic integration. While the overall Distribution reflects a comprehensive approach to twin transition, the slightly lower representation of training, course development, and stakeholder engagement suggests that operational and pedagogical dimensions may lag behind strategic ambitions. These gaps could compromise long-term sustainability unless addressed.

Twin Transition (Green & Digital) Survey Insights

Stakeholders showed the highest agreement with institutional strategies and infrastructure for integrating green and digital transformation (80%+). In contrast, student-focused areas like training, curriculum, and stakeholder engagement received lower agreement levels (<75%), as shown in **Figure 33**.

The results indicate that while strategic commitment and leadership support for twin transition is strong, there is a notable gap in execution—particularly in translating these priorities into student learning, stakeholder involvement, and measurable outcomes. Institutions should prioritize curriculum and training reforms to close the implementation gap, broaden stakeholder involvement, invest in monitoring systems, and translate high-level strategies into actionable, department-level initiatives.

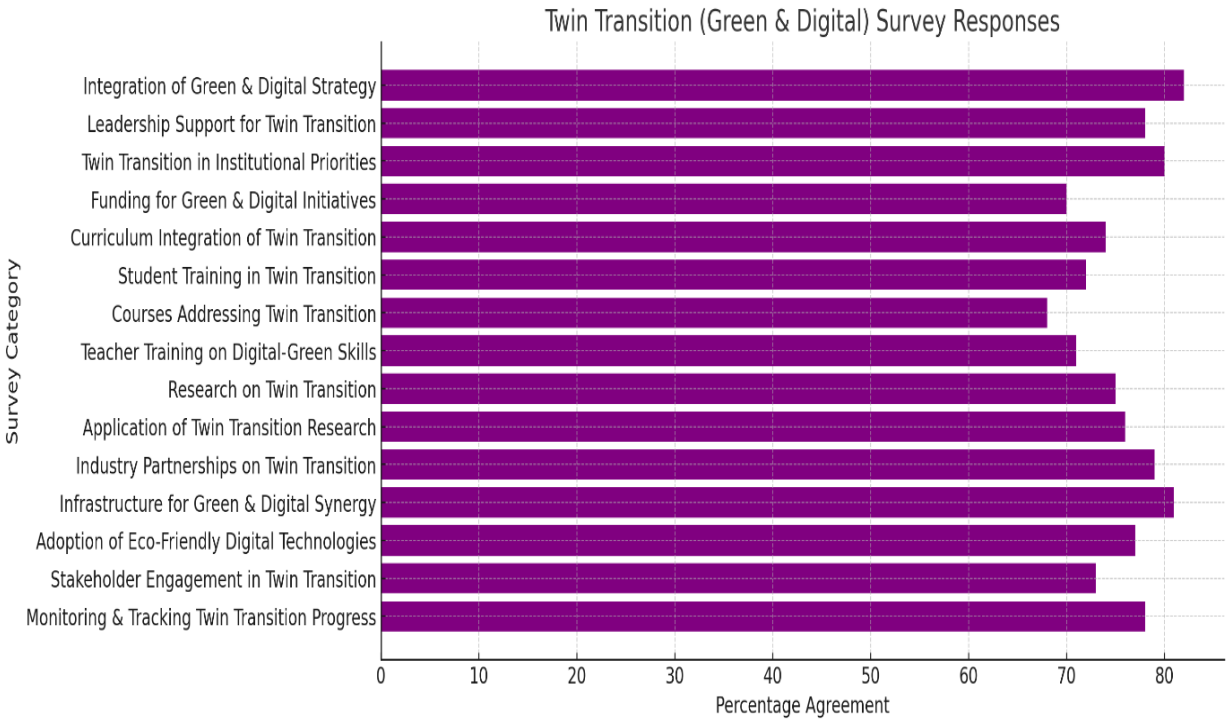


Figure 33: Twin Transition (Green & Digital) Survey Insights

Familiarity with Twin Transition Concepts

Students demonstrated varying levels of familiarity with the twin transition concept. **Figure 34** reveals a significant lack of awareness among respondents, with 47.7% indicating they are not familiar with the concept and 32.3% identifying as only slightly familiar. In contrast, only 15.4% report being moderately familiar, and a mere 4.7% feel very familiar with the twin transition, which refers to integrating digital and green transformation.

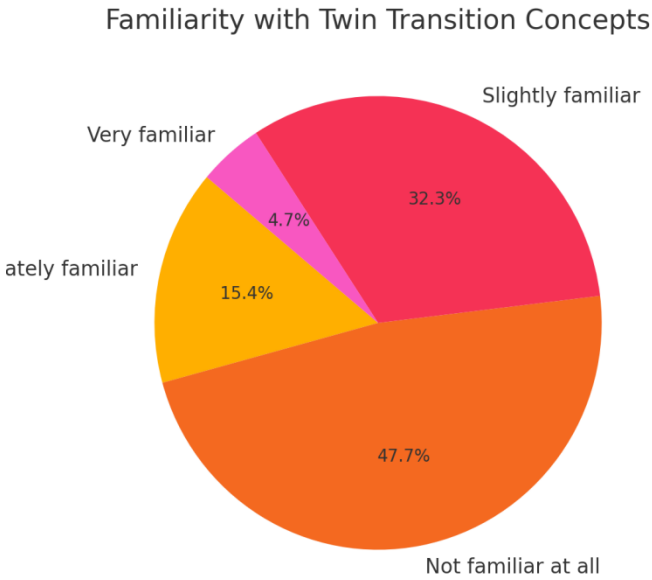


Figure 34: Familiarity with Twin Transition Concepts

This Distribution points to a substantial knowledge gap that may hinder the institution's effective planning and implementation of twin transition initiatives. It underscores the need for targeted awareness campaigns, professional development programs, and more transparent institutional communication to build a foundational understanding among stakeholders.

Curriculum and Teaching Practices

Twin transition topics are not fully integrated across subjects, which limits interdisciplinary understanding. Students showed a strong interest in more interactive and real-world-based teaching methods. The dual bar charts (as shown in **Figure 35**) present insights into two aspects of instructional quality: Teaching Engagement and Curriculum Integration. The chart on the left shows that the majority of respondents found teaching to be moderately engaging, with over 150 responses in this category. This is followed by around 100 responses for slightly engaging, indicating that a sizable portion of students or faculty find the instruction to be effective but lacking in full engagement. Fewer respondents rated the teaching as very engaging, and the smallest group considered it not engaging at all, reflecting overall moderate satisfaction with teaching methods.

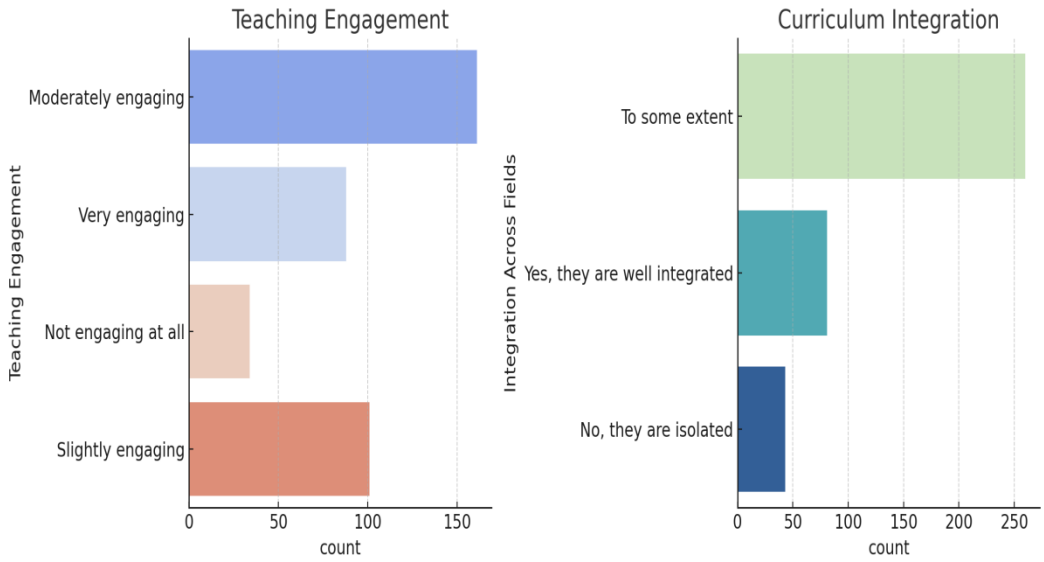


Figure 35: Teaching Engagement and Curriculum Integration

The chart on the right evaluates the integration of curriculum content across fields or disciplines. The majority of respondents (more than 250) believe integration occurs to some extent, suggesting partial or sporadic interdisciplinary connections. A smaller number (~75) agreed that the curricula are well integrated, while a notable minority (~50) felt isolated, pointing to inconsistency in cross-disciplinary teaching approaches. These charts suggest that while teaching is generally seen as moderately engaging and curriculum integration is partially achieved, there is still considerable room for improvement. Strengthening teaching practices

and fully embedding interdisciplinary learning could enhance student engagement and improve alignment with complex, real-world challenges such as those addressed in the twin transition.

Preferences and Skills Confidence

The "Interest in Real-World Applications" (as shown in **Figure 36**) reveals a strong preference among respondents, most likely students or faculty, for incorporating practical, real-life experiences into education.

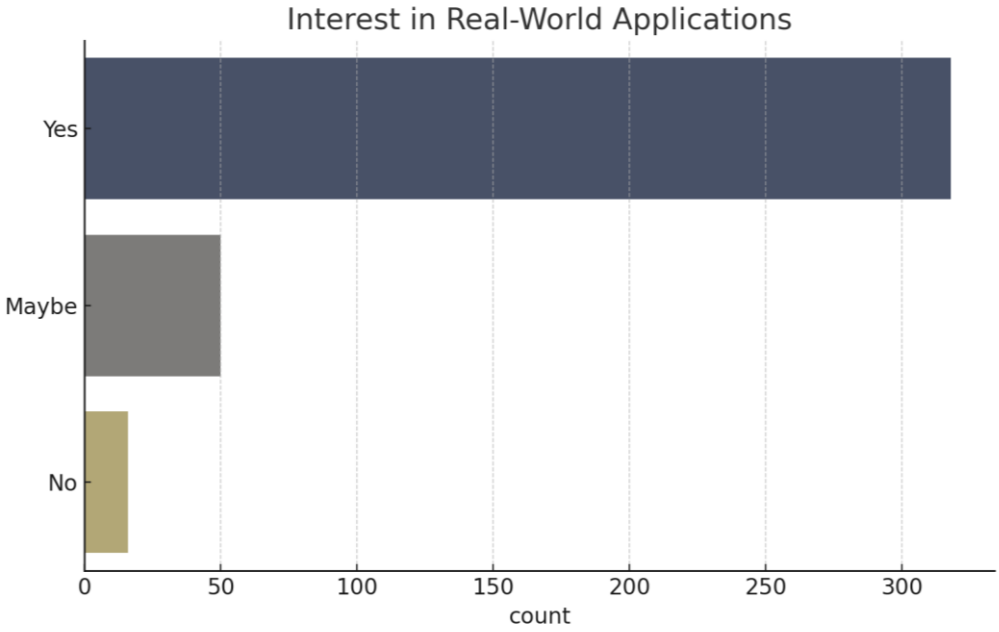


Figure 36: Interest in Real-world Applications

A vast majority, exceeding 300 individuals, expressed a clear interest by selecting Yes, indicating strong enthusiasm for learning approaches emphasizing applicability beyond the classroom. Around 50 respondents chose Maybe, suggesting conditional interest or a desire for more information, while only a small fraction, about 20, selected No, showing minimal opposition. This overwhelming support shows that there is opportunity for institutions to enhance curriculum relevance and student engagement by integrating experiential learning, case-based instruction, and industry-linked projects, particularly in sustainability and digital innovation.

Students generally feel more prepared for the digital transition than the green transition.

The survey results on "Digital vs. Green Preparedness" reveal a clear disparity in perceived institutional readiness, with the majority of respondents, approximately 200, indicating that the institution is better prepared for digital transformation initiatives such as AI and IoT. In contrast, only a small fraction, just over 20 believe the institution is more prepared for green transformation efforts related to sustainability and renewable energy. Around 110

respondents view the institution as equally prepared in both areas, while fewer than 50 believe it is unprepared in either domain. This distribution spotlighted a strong digital bias in the institution's transformation agenda and underscores the need to strengthen green preparedness to achieve a balanced and effective twin transition.

2.4.3.4 Findings from Employer Interviews-Twin Transition

Figure 37 illustrates the extent to which graduates possess the essential skills needed for navigating both digital and green transitions—commonly referred to as twin transition skills.

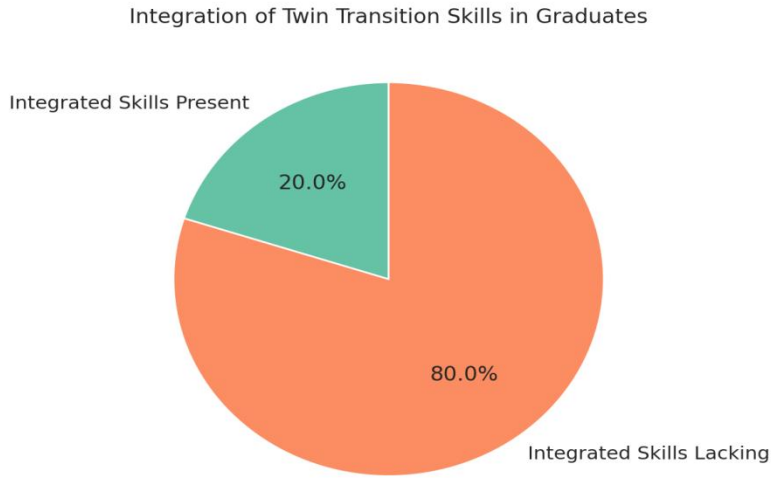


Figure 37: Integration of Twin Transition Skills in Graduates

These skills are increasingly vital in today's workforce as industries move toward sustainable and digitally driven models. According to the chart, 80% of graduates lack integrated twin transition skills. This indicates a significant gap in current education or training systems, which may not adequately prepare students to meet the evolving demands of the labour market. The lack of these integrated competencies could hinder graduates' employability and limit their ability to contribute effectively to organizations embracing digital and green transformation.

On the other hand, only 20% of graduates are reported to possess these integrated skills. While this minority demonstrates that some progress is being made, it also underscores the urgent need for systemic improvements in curriculum design, teaching methods, and experiential learning opportunities that promote digital literacy and sustainability awareness.

Overall, the chart highlights a critical concern for policymakers, educators, and industry stakeholders. Enhancing the integration of twin transition skills in educational programs is essential to ensure that graduates are equipped to thrive in a rapidly changing and increasingly complex professional environment.

The twin transition—simultaneous progress in digital and green competencies—presents a critical challenge and an unparalleled opportunity for higher education. Interviews revealed that few graduates currently possess cross-sector skills bridging green and digital domains. Where they exist, such integrations are limited to isolated examples such as smart classroom energy monitoring or AI-assisted sustainability tracking in healthcare.

For the twin transition to succeed, universities must redesign curricula that do not treat green and digital goals in isolation. Interdisciplinary modules should promote digital solutions for environmental challenges—such as AI for climate modelling, IoT for waste management, and blockchain for green Finance. Moreover, employer feedback strongly supports increased industry-academia collaboration to guide curriculum design, co-develop real-world learning experiences, and embed long-term sustainability and resilience in education.

Employers interviewed expressed concerns over graduates' limited exposure to green practices such as waste management, climate literacy, sustainable infrastructure design, and eco-friendly practices in hospitality and public services. The most cited green competencies include environmental policy awareness, sustainable procurement, renewable energy, and green Finance. Respondents called for universities to embed environmental education into disciplinary learning and provide opportunities for field-based sustainability projects.

The twin transition demands the convergence of digital innovation with green sustainability practices. However, integration remains weak among graduates, with few examples of digital tools used to achieve green outcomes (e.g., AI-driven energy management or digital monitoring of waste reduction). Successful cases, though rare, illustrate the potential: smart classrooms reducing paper waste, digital dashboards tracking hospital emissions, and apps managing food inventory to reduce waste in catering services. Universities must champion programs that equip students with cross-sectoral skills that fuse sustainability with digital capability.

Integration of Digital and Green Skills

The data reveals that **65% of graduates do not integrate** these skills at all, pointing to a critical gap in higher education curricula, as shown in **Figure 38.**

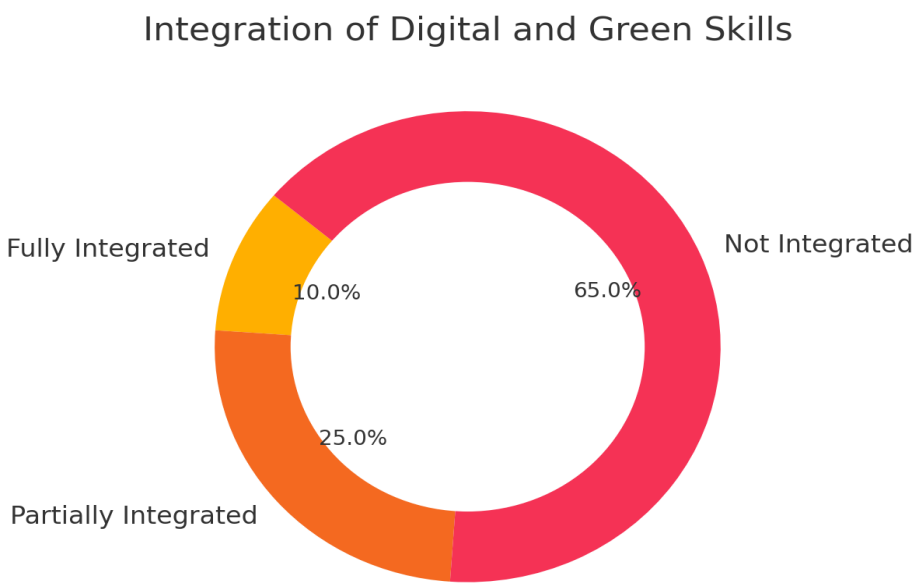


Figure 38: Integration of Digital and Green Skills

Only **25% showed partial integration**, suggesting that while some awareness exists, efforts to combine digital tools with green practices are still fragmented and inconsistent. A mere **10% of graduates are fully integrating** digital and green skills, indicating that very few are equipped to support the Twin Transition effectively. This concept emphasizes the synergy between technological innovation and sustainable development.

There is an urgent need to design interdisciplinary programs that intentionally foster the **co-application of sustainability and digital innovation**. For instance, students should learn about AI and data analysis and how to apply these tools in managing energy use, reducing emissions, or promoting green Finance. Without targeted reforms, graduates will remain underprepared for roles that demand integrated, future-ready solutions to global challenges.

In conclusion, there is an urgent need for higher education institutions to actively embrace the twin transition by aligning educational practices with the demands of a rapidly evolving digital and sustainable economy. To achieve this, institutions should prioritize strategic curriculum reform, strengthen collaborations with industry, and provide more experiential learning opportunities. Key recommendations include supporting faculty development to integrate sustainability and digital tools into pedagogy, launching interdisciplinary programs that focus on the digital-green nexus—especially in critical sectors like energy, health, Finance, and education—and embedding digital and green literacy as core competencies across all academic disciplines. Expanding industry partnerships to co-design practical training and internship opportunities will equip students with relevant, future-ready skills.

2.4.3.5 Summary of findings on twin transition

The report on the twin transition at the University of Education, Winneba (UEW) highlights the institution's limited progress in effectively integrating sustainability (green transition) and digital transformation. While there is a general awareness of the importance of aligning these two domains, the transition remains largely conceptual and lacks formal institutional structures, measurable indicators, or consistent review mechanisms. Without a strategic framework, the university has struggled to translate its aspirations into actionable plans across its academic and operational environment.

Faculty responses reveal that interdisciplinary collaboration and stakeholder engagement are weak. Cross-departmental initiatives are minimal, and internal (faculty, students) and external (industry partners) stakeholders have limited involvement in twin transition activities. The lack of systemic engagement hinders innovation and the practical application of integrated digital-green solutions.

Curriculum gaps and limited faculty capacity are also major concerns. Twin transition concepts have not been adequately incorporated into teaching practices. While faculty awareness of digital tools is improving, many lack the skills or confidence to apply these tools in the context of sustainability. As a result, students are not gaining sufficient exposure to the kinds of interdisciplinary, real-world experiences needed to build future-ready skills.

Furthermore, students and graduates are underprepared for the demands of the modern workforce. While digital readiness is moderately better, knowledge and skills in applying digital tools for sustainability are minimal. Employer feedback indicates that 80% of graduates lack integrated digital-green competencies, underscoring the need for curriculum reform, skill-based training, and closer collaboration with industry.

Despite some strategic alignment and leadership support, inadequate funding, infrastructure, and implementation mechanisms constrain progress. To bridge the gap between policy and practice, UEW must prioritize introducing core digital and green literacy across all programs, developing interdisciplinary modules, providing targeted faculty training, expanding experiential learning opportunities with industry, and establishing robust monitoring systems to track outcomes and ensure accountability.

2.4.3.6 Priority Measures to be taken by UEW to improve twin transition (2025–2027)

1. Develop and Institutionalize a Twin Transition Framework

- Survey data reveals the lack of a structured and coordinated institutional approach to twin transition.
- UEW should establish a formal twin transition policy and implementation roadmap that defines objectives, timelines, and departmental responsibilities. This should include performance indicators and monitoring mechanisms to ensure sustained progress.

2. Redesign Curriculum to Embed Interdisciplinary Twin Transition Modules

- Most programs isolate digital and green themes, limiting student preparedness for integrated challenges.
- UEW should revise curricula to introduce interdisciplinary modules that explore applying digital tools like AI, IoT, and blockchain to address sustainability challenges. These should be embedded into core education, energy, health, and finance courses.

3. Build Faculty Capacity to Teach Integrated Digital-Green Content

- While faculty understanding of twin transition concepts is increasing, most lack training to implement integrated pedagogy.
- UEW should launch targeted faculty development programs focused on teaching at the digital-green interface. Support could include workshops, expert collaborations, and incentives for designing new content and teaching strategies.

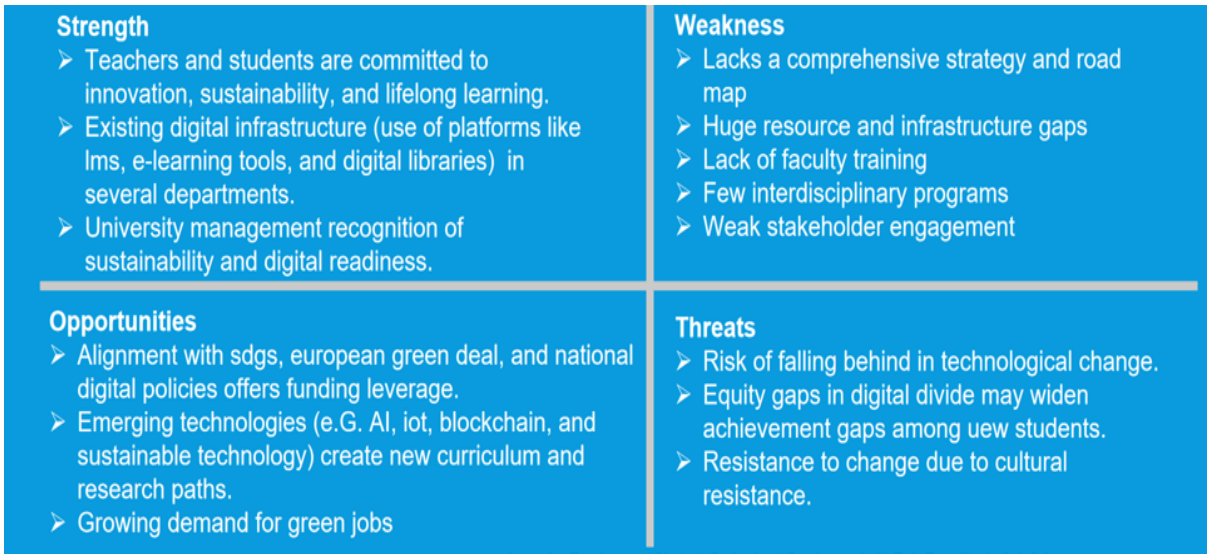
4. Foster Cross-Sectoral and Industry Partnerships for Experiential Learning

- Graduate readiness for twin transition roles remains low due to limited engagement with real-world applications.
- UEW must collaborate with industry, NGOs, and government to support internships, capstone projects, and case studies integrating digital and green practices. Examples include smart energy monitoring, digital emissions tracking, and sustainable tech entrepreneurship.

5. Establish Monitoring Systems and Student-Led Innovation Hubs

- There is no institutional mechanism to measure progress or engage students as innovators in the twin transition.
- UEW should build a twin transition monitoring and evaluation framework and support student-led innovation labs. These hubs would serve as testing grounds for digital-green solutions and foster peer-to-peer learning across faculties.

2.5 SWOT Analysis of Preparedness for the Twin Transition



2.6 The key areas for further intervention to enhance preparedness for the Twin Transition

Ten (10) prioritized activities that can be done by UEW till the end of 2027.

Activity	Dimension	Who	When
Upskill faculty in sustainability, digital tools, and pedagogy	**Capacity Building**	Faculty Dev. Units, Academic Leadership	Q1 2025 Q4 2026
Fund interdisciplinary Research and incentivize high-impact publications	**Research Excellence**	Research Offices, Councils, Faculties	Q2 2025 Q3 2027
Embed SDGs, climate literacy, and circular economy into all disciplines	**Curriculum Innovation**	Curriculum Boards, Academic Departments	Q1 2025 Q4 2026
Strengthen PPPs, alumni links, and community-based learning	**Stakeholder Engagement**	External Relations, Management	Q2 2025 Q4 2027
Diversify funding via EU grants, sponsorships, and foundations	**Financial Sustainability**	Finance Offices, Grant Writers, Research Admin	Q1 2025 Q4 2027

Co-develop applied Research and work-based learning programs	**Industry Collaboration**	Career Services, Innovation Units, Faculties	Q2 2025 Q4 2027
Launch interdisciplinary courses with real-world cases	**Twin Transition Curriculum**	Academic Boards, Instructional Designers	Q3 2025 Q3 2026
Host symposiums and webinars on digital and green transformation trends	**Knowledge Dissemination**	Intl. Office, Events Team, Faculties	Q2 2025 Q4 2027
Establish faculty exchange and research alliances	**Global Engagement**	Intl. Relations, University Leadership	Q1 2025 Q4 2027
Upgrade IT infrastructure for hybrid learning and smart campus services	**Digital Transformation**	ICT Dept, CIO, Infrastructure Teams	Q2 2025 Q2 2027

2.7 Annexes

Annex 1. List of study programmes related to green and digital transition at UEW

Name of Study Programme	Faculty	Level (BSc/MSc/PhD)
BSc Environmental Sustainability and Education	Science Education	BSc
BSc Renewable Energy Technologies	Science Education	BSc
BSc Information and Communication Technology	Science Education	BSc
MSc Digital Learning and Educational Innovation	Applied Behavioural Sciences in Education	MSc
MSc Climate Change and Sustainable Development	Social Science Education	MSc
PhD Educational Technology and Sustainability Integration	Applied behavioural Sciences in Education	PhD

Annex 2. List of courses/subjects related to green and digital transition at UEW

Name of Course/Subject	Name of Study Programme	Faculty	Level (BSc/MSc/PhD)
Sustainable Development and Environmental Education	BSc Environmental Sustainability and Education	Science Education	BSc
Renewable Energy Systems	BSc Renewable Energy Technologies	Science Education	BSc
Climate Change and Adaptation Strategies	MSc Climate Change and Sustainable Development	Social Science Education	MSc
Digital Literacy and ICT Integration	BSc Information and Communication Technology	Science Education	BSc
Data Analytics for Social Impact	MSc Digital Learning and Educational Innovation	Applied behavioural Sciences in Education	MSc
Educational Technology and Innovation	PhD Educational Technology and Sustainability Integration	Applied behavioural Sciences in Education	PhD
Artificial Intelligence in Education	PhD Educational Technology and Sustainability Integration	Applied behavioural Sciences in Education	PhD
Smart and Green Infrastructure Design	BSc Renewable Energy Technologies	Science Education	BSc
Green Finance and Environmental Economics	MSc Climate Change and Sustainable Development	Social Science Education	MSc
E-learning Platforms and Digital Pedagogies	MSc Digital Learning and Educational Innovation	Applied behavioural Sciences in Education	MSc

Annex 3. Comprehensive Summary of Stakeholder Respondents and Focus Areas

Total Respondents	Departments/ Industry	Purpose of Interview	Key Focus Area	Data Collection Method	Survey Instrument Type/ Date	Response Rate or Completion Rate
31 Institutional Leadership	Management, Academic Affairs, Planning, All Faculties	Assess leadership perspectives on twin transition preparedness	Policy direction, institutional strategy, and resource planning	Structured Questionnaire	Google Form/ Jan-April 2025	100% (all invited participants responded)
108 Higher Education Teachers	Education, ICT, All faculties	Evaluate educators' readiness for twin transition	Curriculum integration, teaching practices, and capacity building	Structured Questionnaire	Google Form/ Jan-April 2025	90% (estimated from the target sample)
384 Students	Education, All faculties, Health	Assess student awareness and engagement	Preparedness, experiential learning, skill development	Structured Questionnaire	Google Form/ Jan-March 2025	85% (based on class cohorts)
10 Employers/ Industry players	Health, Education, Hospitality, Banking and Finance, Energy, Media	Assess graduate competencies twin transition	industry expectations, and potential for collaborative initiatives supporting twin transition goals.	Face-to-Face Interviews	Interview/ Jan-March 2025	100% (all invited participants responded)

Note: Data was collected from Main & South Campuses as well as Effutu Municipality

3 The Report on Local Industry Needs and Knowledge Gap Specification of the International University of Management, Namibia

3.1 University at a Glance

The International University of Management (IUM) traces its origins back to 1994 when it was first established as an institute of higher education. Founded by Professor David Richard Namwandi, the institution began with a vision to provide quality education and contribute meaningfully to the development of Namibia and the broader Southern African region.

In 2002, the institute underwent a significant transformation and was officially recognized as IUM, marking a new chapter in its growth and academic expansion. Since then, IUM has grown steadily both in size and reputation. The university currently employs approximately 404 staff members, which includes both academic and administrative personnel, all working together to support its educational mission. With a student population of around 19,200, IUM is one of the largest tertiary institutions in Namibia. Over the years, it has successfully graduated approximately 3,150 alumni, many of whom have gone on to contribute significantly to various sectors across the country and beyond.

The International University of Management is ranked amongst the many universities worldwide, continentally and nationally. For instance, at the international level, IUM is ranked at 10, 233 out of 14, 131, while at the continental level IUM is ranked 487 out of 1, 104. At the national level, IUM is ranked third amongst the four universities.

3.1.1 Faculties, Centres, and Regional Operations at The International University of Management

The International University of Management comprises a diverse academic structure with several faculties and specialized centres. The university's faculties include the Faculty of Environmental Management and Sustainability Science (FEMSS), School of Primary Education (SPE), School of Secondary and Postgraduate Education (SSPE), Faculty of Information and Communication Technology (ICT), Faculty of Health Sciences (HS), Faculty of Strategic Management and Business Administration (SMBA), and the Graduate School of Business (GSB). In addition to these faculties, IUM operates key centres aimed at enhancing learning and institutional performance. These are the Centre for Distance and E-learning (CDeL), the Centre for Improved Institutional Performance (CIIP), and the Centre for Languages and Communication (CLC).

The International University of Management has a strong regional presence across Namibia. The main campus is located at Dorado Park in the Khomas Region, which also hosts the IUM City and IUM Independence Branches. Other campuses include Ongwediva in the Oshana Region, Eenhana in the Ohangwena Region, Nkurenkuru in the Kavango West Region, and the Coastal Campus in the Erongo Region. This widespread footprint supports IUM’s commitment

to accessible and inclusive higher education throughout the country. The Dorado Park campus is the biggest in terms of student population and facilities, houses the Office of the Vice-Chancellor and all Heads of administrative and management staff structures.

3.1.2 International University of Management's Role in the local economy

The International University of Management play a pivotal role in the local economy through different areas as detailed below.

Regional Development and Economic Growth

The International University of Management plays a vital role in advancing regional development by establishing campuses across various regions, including Khomas, Oshana, Erongo, Ohangwena, and Kavango West. These campuses not only expand access to quality education beyond urban areas but also stimulate local economies by generating employment and supporting nearby businesses. Additionally, through its research and consultancy services, IUM offers informed policy recommendations that promote sustainable economic growth in Namibia.

Entrepreneurship and Innovation

Entrepreneurial thinking is embedded throughout IUM's academic programs, from the first to the final year of study. This approach encourages students and alumni to develop creative and practical solutions to address the country's economic challenges, with a strong focus on small and medium enterprise (SME) development and digital innovation.

Industry Collaboration and Workforce Development

The International University of Management maintains strong partnerships with businesses, government entities, and international organizations to ensure its academic offerings are aligned with current industry demands. These collaborations provide students with valuable opportunities for internships, joint research, and practical training, ultimately improving their employability and supporting workforce development across various sectors.

Capacity Building and Public Sector Engagement

The university is actively involved in training professionals, including public servants and business leaders, in essential disciplines such as finance, management, ICT, education, health, agriculture, and environmental science. By working closely with government ministries and public institutions, IUM contributes to better policy implementation and enhanced governance.

Social Responsibility and Community Engagement

Committed to social impact, IUM engages in a range of outreach initiatives, including scholarship programs and skills development projects aimed at uplifting marginalized communities. The university also undertakes research that addresses critical national issues

such as climate change, environmental sustainability, and public health, reinforcing its role as a catalyst for positive societal change.

3.1.3 Key Achievements

The International University of Management is the first of its kind in Africa to establish a Faculty of HIV/AIDS. Given the magnitude of the HIV and AIDS pandemic in Africa, the importance of such a faculty cannot be overemphasized. Established as one of Namibia's leading private universities, offering undergraduate, postgraduate, and doctoral programs in business, finance, IT, health sciences, Education, Environment and other fields. In addition, IUM expanded its campus network across Khomas, Oshana, Ohangwena, Erongo, and Kavango West, improving access to higher education nationwide. Therefore, the university implemented e-learning platforms and digital resources to enhance learning accessibility.

3.2 University Organization and Management

The university is managed through Governing Council which provide strategic direction, followed by Executive Committee which ensures the smooth operations of the university. From the academic stream, Senate is the highest body entrust with mandate to take strategic academic decisions and ensure the implementation. The next level is for Academic and Research Committee, which receive and refine policy proposals and qualifications development and reviews from faculties, for recommendation to Senate.

3.2.1 Human Resources at the University

The International University of Management is supported by a dedicated team of professionals, comprising 261 academic staff and an equal number of 261 researchers who contribute to the institution's robust educational and research environment. In addition, there are 143 non-academic staff members who ensure the smooth operation of the university's administrative functions. The university is a private, non-profit organization committed to providing quality education.

3.2.2 Training for University Staff

The university offers a wide array of professional development programs aimed at enhancing the skills and well-being of its staff. These include training in Cybersecurity Awareness, ensuring staff are equipped to protect sensitive information, and Minute Taking for Frontline Staff to improve documentation and communication. Additionally, programs focus on fostering Emotional Intelligence in the Workplace, Employee Motivation and Engagement, and promoting a positive Organizational Culture and Climate. To address the evolving needs of staff, the university conducts Training Needs Assessments (TNA).

The university offers staff professional development in areas such as Team Dynamics, Collaboration, and Change Management. Employee Well-Being Programs, Workplace Conflict Resolution, and Cross-Cultural Management are also key areas of focus, helping staff navigate

complex and diverse work environments. Other programs aim to strengthen Coping Skills, build individual and team resilience, and improve Employee Stress Management. The university further supports staff through training in Job Analysis and Design, Occupational Health Psychology (OHP), and Employee Selection and Assessment. Additionally, Workforce Analytics and People Analytics are utilized to enhance decision-making, alongside training in Ethical Leadership, Decision-Making, and Employee Retention Strategies, ensuring the creation of a supportive and sustainable work environment.

3.3 Education

The International University of Management pride itself as a Namibian university dedicated to its people's future; therefore, the qualifications that are offered are impactful and demand driven. This is evident in the huge growth in enrolment of various qualifications.

3.3.1 Enrolment

Table 1 shows the students enrolment for 2025 across all IUM's campuses. The Bachelor Honours is the most popular level with a record of 15570, followed by diplomas with 3657. Degrees of Doctor of Philosophy occupy the last space at 115.

Table 1: Student Enrolment per Levels in 2025

Qualification Type	Total Count of Students Registrations for 2025	Percentage
CERTIFICATES	1716	7.1%
DIPLOMAS	3657	15.2%
BACHELORS	1419	5.9%
BACHELOR HONOURS	15570	64.7%
POSTGRADUATE DIPLOMAS	429	1.8%
MASTERS	1145	4.8%
DOCTORATES	115	0.5%
Grand Total	**24051**	**100.0%**

3.3.2 Qualifications

According to Table2, the institution offers a diverse range of study programs, with Master at level 9 being the highest with 30 different qualifications. Bachelor Honours at level 8 is the second highest with 24 different qualifications. The least qualification level is Bachelor Level 7 with seven qualifications. All the qualifications relevant to green and digital transitions are listed under annexure 1 and 2.

Table 2: Number of qualifications at different Level of offerings

Qualification Levels	Number of Qualifications
Certificate	14
Diplomas	16
Bachelor Level 7	7
Bachelor Honours Level 8	24
Postgraduate Diploma Level 8	14
Master Degree Level 9	30
PhD Level 10	12

3.3.3 Accreditation

All qualifications offered by the university are nationally accredited by the Namibian Qualifications Authority (NQA) and the National Commission on Higher Education (NCHE), ensuring they meet the country's educational standards. All programs undergo a rigorous quality assurance process and are accredited nationally by the Namibia Qualifications Authority (NQA) and the National Commission on Higher Education (NCHE), ensuring that the university meets high standards of academic excellence. Additionally, the subject matter experts appointed by the NQA to evaluate and ensure the quality of these programs include international experts, bringing a global perspective to the accreditation process and further enhancing the credibility and quality of the university's offerings. The institution holds a scope of accreditation certificate, further reinforcing its commitment to delivering accredited and recognized higher education.

3.3.4 Additional Educational Offerings

The university has offered various trainings to students and staffs on digital usage. However, there is a gap in terms of educational opportunities for green transitions.

3.4 Self- assessment of key dimensions

The International University of Management carried out a study aimed at assessing the key dimensions namely, green, digital, and twin (combined green and digital) transitions. The study was done from January to April 2025. The study involved the Faculty of Information Communication Technology, Faculty of Environmental Management and Sustainability Science, School of Secondary and Postgraduate Education and School of Primary Education. The methodology used is detailed in the following sections.

3.4.1 Methodology

The study employed mixed methods to collect data from various participants and respondents on different focus areas. Table 3 summarizes the methodology used for the study.

Table 3: Methodology for the study

Stakeholders	Data Collection Instrument	Key Focus Area
Institution Management *(Leadership)*	Questionnaire (Google Form)	Gather perspectives from top management, directors and academic leadership on the preparedness for the Twin Transition.
Higher Education Teachers *(Lecturers)*	Questionnaire on (Google Form)	Explore how prepared educators are to harmonize green and digital transitions in their teaching practices, fostering synergy and long-term resilience in an evolving educational landscape.
Students *(from Education, ICT and Environment)*	Questionnaire on (Google Form)	Assess the preparedness of students for the challenges and opportunities presented by twin transition.
Local Industry Representative *(from ICT, Education, Environmental)*	Focus Group Discussion (Zoom Platform)	Discuss and examine the preparedness of university graduates for the green and digital transitions.

As show in Table 3, the study used focused group discussion with local employers and questionnaire Institution Management (Leadership) Higher Education Teachers (Lecturers) and students.

3.4.2 Respondents

Table 5 summarizes the responses from different participants and respondents from different stakeholders.

Table 4: Response rate

Stakeholders	Proposed Sample	Number of Respondents	Background Information of the Participants
Institution Management (Leadership)	38	12	Vice-Chancellor, Pro-Vice Chancellor for Academic, Research and Innovation, Pro-Vice Chancellor for Administration and Management, Registrar, Deans, Directors for HR, Finance, Marketing, Quality Assurance and HODs

Stakeholders	Proposed Sample	Number of Respondents	Background Information of the Participants
Higher Education Teachers (Lecturers)	50	12	From the 2 Faculties and 2 Schools that participated in the study
Students	120	121	From the 2 Faculties and 2 Schools that participated in the study from year 2-4 Bachelors Honours and Masters Students
Local Industry Representative	10	15	School Principals, Education Inspectors, Senior education Officers, Chief Education Officers, NAMRA, ICT Consultants, Nampol, Ministry of Environment, Forestry and Tourism, Environmental Practitioners (Private Companies)
Total	**218**	**160**	

The study has recorded a good response from students and local employers; however, poor responses from Institution Management (Leadership) and Higher Education Teachers (Lecturers).

3.4.3 Data Analysis and presentation

Data was analyzed and implemented according to the types of data collected.

Quantitative data

The study employed a descriptive data analysis technique to analyse and present the data collected through questionnaires and focus group discussions. Descriptive analysis was used to summarize and explain patterns, frequencies, and percentages that reflect the readiness levels of different university stakeholders (institutions, students, employers, and teachers) for green, digital and twin transitions.

Qualitative data

Qualitative data were analysed through a narrative description to explain the meaning of the data in simple, understandable language. The narratives provided to validate the figures and tables. In addition, highlighted key insights, such as which group was most or least prepared and what possible measures might need to be taken.

3.4.4 Preliminary Findings

Figure 3 illustrates the perceived readiness of institutions, students, employers, and teachers at IUM to engage in green, digital, and twin (combined green and digital) transitions.

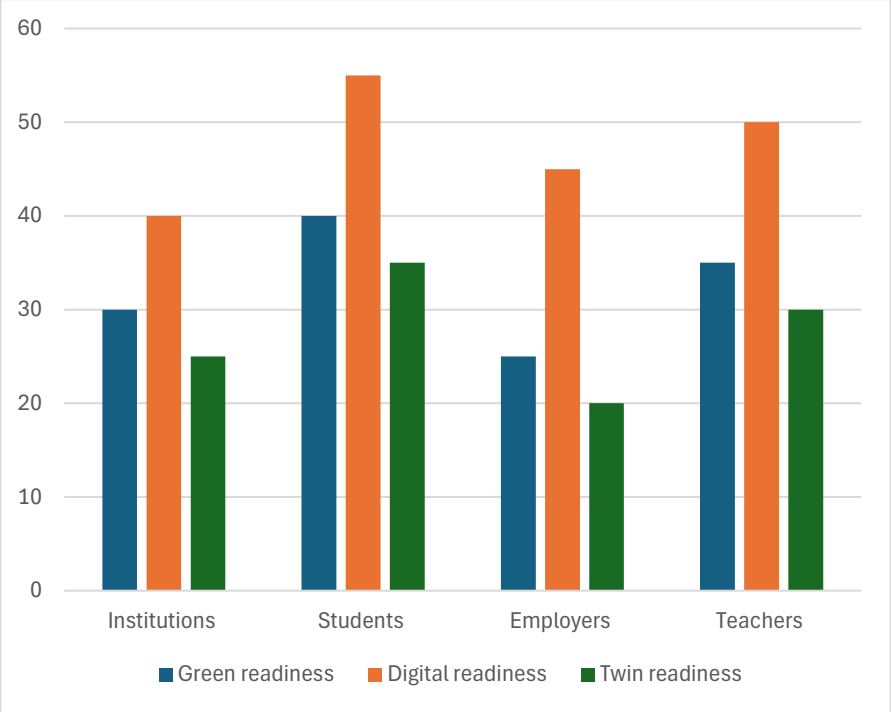


Figure 12: IUM readiness for twin transition

3.4.4.1 Going green

According to Figure 3, green readiness among stakeholders can be rated as moderate indicating that there is awareness but not sufficient preparation or integration of green principles across key university stakeholders. Therefore, the study reveal that the university lack a well-defined sustainability strategy that integrate sustainability and circular economy principles into practices and curricula. Consequently, the leadership commitment to green initiatives is limited resulting in insufficient financial and human resources for sustainability. Furthermore, the study reveal that green infrastructure implementation is inconsistent and there is minimal collaboration with external partners on sustainability.

In terms of teachers, the study shows that sustainability and digital transformation are viewed separately, resulting in limited integration of green transition concepts in teaching. In addition to this, the study shows low awareness of sustainability frameworks and policies. Moreover, there are few structured training programs for teachers on sustainability. Therefore, there is a need for support in embedding green concepts into courses.

Student self-assessment findings highlight the lack of hands-on training in sustainability practices, as well as limited exposure to environmental impact analysis and circular economy principles. Students further indicated that green transition skills such as energy efficiency and

climate adaptation are inadequate. On this basis, students are requesting for more experiential learning opportunities on sustainability.

According to employers, graduates often lack practical experience in sustainability-related fields, such as renewable energy, waste management, and green building practices. While the university is introducing these concepts, they need to strengthen applied training to enhance employability. Moreover, employers emphasized the need for paperless workflows, digital record-keeping, and energy-efficient work environments. Hence, many employers are advocating for the university to put more efforts in preparing students for environmentally conscious workplaces. To this end, some participants highlighted gaps in knowledge regarding environmental laws and regulations; therefore, recommending the university to incorporate legal and policy frameworks related to sustainability in the curriculum.

Overall, all stakeholders have alluded to the lack of a formal sustainability strategy and limited leadership engagement. As a result, sustainability is partial integrated in the curriculum. absence of interdisciplinary programs. Thus, a need for clear monitoring system for tracking sustainability efforts and outcomes.

To overcome the shortcomings identified by the various stakeholders, possible measures to be taken in the next 3 years were suggested. Firstly, develop a formal sustainability strategy with leadership commitment and resource allocation. Secondly, fully integrate sustainability topics across all programs and encourage interdisciplinary courses (e.g., combining sustainability and digital tools). Thirdly, strengthen green research and innovation, with collaborations between academia and industries. Fourthly, invest in eco-friendly campus infrastructure, including renewable energy and sustainable transport. Finally, establish clear Key Performance Indicators and monitoring systems to track the progress of green initiatives and involve stakeholders in feedback loops.

3.4.4.2 Going digital

According to Figure 3, digital readiness is consistently the highest across all stakeholders, indicating that participants are more comfortable and prepared for digital transformation. The management demonstrates a strong awareness of the value of digital tools in teaching and learning. However, reporting that the adoption of these tools across the university is uneven, primarily due to the absence of a comprehensive digital transformation strategy. Suggesting that such a strategy would provide structured guidance on how best to integrate and utilise digital technologies within the institution. This lack of strategic direction has led to limited research and innovation in digital transformation. Moreover, management express that the university lacks robust monitoring and evaluation mechanisms to assess the effectiveness and impact of digital tool usage. As a result, institutional investment in digital infrastructure remains minimal. Consequently, the university's engagement in the broader digital landscape is restricted, limiting opportunities for strategic partnerships and collaboration with other institutions in the realm of digital transformation.

The findings indicate that many lecturers are motivated and willing to integrate digital tools into their teaching practices. However, they express concerns regarding limited institutional support and the ongoing challenge of adapting to the constant emergence of new digital innovations. The adoption of digital tools is found fragmented and inconsistent across the academic staff. Several lecturers have specifically identified the need for continuous professional development, particularly in areas such as artificial intelligence (AI), data analytics, and other emerging technologies. There is a clear call for structured and sustained institutional support to enable effective and coherent integration of digital tools into teaching and learning.

Students have ranked their general digital literacy as being moderate. This is due to their limited exposure to AI and data analytics for sustainability. Consequently, students continuously in search for digital skills, offered through structured training schedule. In addition, students aspire for better access to research, policies and digital learning platforms in order to sharpen their digital literacy and proficiency. Moreover, recommending there is a need for hands-on learning activities in emerging digital fields.

The university equip students with fundamental computer literacy skills; however, employers have expressed the need for deeper expertise in emerging areas such as cloud computing, artificial intelligence (AI), data analytics, cybersecurity, and digital collaboration tools. Employers have observed that many graduates are struggling with the application of digital tools required in modern industries, such as Excel for data analysis, AI-driven applications, and sector-specific digital platforms (e.g., GIS for environmental sciences or fintech solutions for finance). In addition, the ability for students to work remotely and utilize digital project management tools was highlighted by employers as a key requirement for graduates. Employers recommended stronger university training in digital communication platforms, virtual collaboration, and digital literacy for students to enable them to perform work efficiently and effectively.

To sum up, the study highlights the absence of a comprehensive digital transformation strategy and weak leadership drive. Limited integration of digital literacy and technology-enhanced learning in curricula. Insufficient research on digital innovation and weak university-industry collaboration. Poor digital infrastructure (e.g., internet, cloud services) and inadequate cybersecurity frameworks.

In the next three years, the university should adopt a clear digital transformation strategy backed by dedicated resources. This includes integrating advanced digital skills such as AI, data analytics, and cybersecurity into all academic programmes, and promoting research focused on practical digital applications. Upgrading infrastructure, including a robust LMS, high-speed internet, and cloud systems, is essential. Partnerships with tech companies should be pursued to support innovation and student exposure. Lastly, effective monitoring and feedback systems must be developed to track progress and adjust strategies as needed.

The possible measures include a comprehensive digital strategy and allocate dedicated resources and integrate advanced digital competencies (AI, data analytics, cybersecurity, digital collaboration tools) into all academic programs.

3.4.4.3 Going twin

According to Figure 3, twin readiness is the lowest for all groups, highlighting the challenge of combining green and digital initiatives simultaneously. Analysis of the institution's overall readiness to harmonize green and digital transitions shows that the university has no strategy integrating digital and sustainability transitions. This is owed to the limited interdisciplinary programs connecting both aspects, and weak industry collaboration on twin transition research. Furthermore, the study emphasised low investments in eco-friendly digital infrastructure and minimal stakeholder involvement in twin transition projects. Finally, the management indicated that there is no structured framework for tracking twin transition progress.

Teachers' self-assessment findings shows that a moderate understanding of twin transition concepts. Few teachers integrate both digital and sustainability topics in their courses. Furthermore, the study indicated the lack of project-based learning on digital sustainability solutions. Therefore, there is a need for interdisciplinary collaboration and expert training, as well as real-world case studies demonstrating twin transition success. On the other hand, student self-assessment findings reveal the limited awareness of the twin transition concept. Students feel more prepared for digital than green transformation. However, they indicated that there are few structured courses addressing both transitions together. Therefore, students request modern technology tools and real-world applications. Desire for ethical training on the responsible use of digital and green technologies.

According to employers, several employers noted that while students understand digital tools theoretically, practical application remains a challenge. There is a need for more hands-on training, internships, and industry partnerships to help students apply digital and green economy concepts in real-world settings. Many participants emphasized that the university should work closely with industries to continuously update curricula to reflect emerging trends in digitalization and sustainability. Employers stressed that universities should train students to leverage AI-driven automation, particularly in areas such as data processing, customer service, and manufacturing.

In summary, there is a lack of interdisciplinary curriculum connecting sustainability and digitalization. This can be attributed no integrated strategy combining green and digital transformations. In addition, the highlight of the study includes minimal twin transition research and limited practical application opportunities.

The study recommends the development an integrated twin transition strategy, aligned with long-term institutional vision. This means that the university embed interdisciplinary courses focusing on AI for sustainability, smart environmental management, and circular economy. Support twin-focused research and innovation, involving students in real-world twin

transition projects. Therefore, the university need to invest in smart, sustainable campus solutions (IoT-managed energy systems, green IT practices). As a complementary, the university need to facilitate collaborations with industry and government to co-design twin transition solutions. Establish comprehensive evaluation mechanisms with clear indicators and feedback systems for continuous improvement

3.5 SWOT Analysis of Preparedness for the Twin Transition

Table 6 show the analysis of the university to inform the readiness of the institution in integrating the twin transitions. The overall analysis shows that IUM is standing a good chance of transformation into green digitalization.

Table 5: The International University of Management SWOT analysis

Strengths	**Weaknesses**
• Human capital: willing and motivated educators and students. • Facilities: existing use of digital tools in some areas, i.e., LMS, e-Learning, virtual technology • Existing industry collaborations. • Institutional support: leadership recognizing the need for change, allocated time for research and community engagement in the workload.	• No formal twin transition strategy. • Limited resources and insufficient infrastructure. • Few interdisciplinary programs. • Limited faculty training. • Weak stakeholder engagement.
Opportunities	**Threats**
• Growing global/national focus on green/digital economies. • New technologies and funding opportunities. • High employer demand for twin transition skills. • Supportive government policies for curriculum reform.	• Rapid tech evolution outpacing adaptation. • Funding limitations. • Resistance to change. • Digital divide among students. • Competition from advanced institutions. • Unstable policy direction.

3.6 The key areas for further intervention to enhance preparedness for the Twin Transition

According to Table 7, several activities were listed for actions and responsible institutions were establish in order to ensure accountability and meeting of deadlines. Numerous activities are planned to take place from 2025 until 2027.

Table 6: Roadmap for twin transition

Activity	Dimension	Who	When
Develop and implement Green and Digital Transition Policy	Both	TeProD Members / University Management/ ICT Faculty / ICT services	Q1 2026
Conduct training workshops on green and digital skills for teachers	Both	CIIP /TeProD Team	Bi-annually from Q2 2025 to Q4 2027
Integrate green and digital competencies into the curriculum	Both	Academic Departments/Quality Assurance/TeProD Team	Q1 2025 – Q4 2026
Establish Green & Digital Innovation Hub for students and staff	Both	Centre for Digital Initiatives (CDI)/ ICT Faculty/ ICT services	Q1 2025, Ongoing
Industry partnerships for joint projects focusing on green and digital solutions	Both	Centre for Grants management, Consultancy and resource mobilization/ Directorate of Postgraduate Studies and research	Q3 2025, ongoing through 2027
Organize awareness campaigns on twin transition benefits for students and staff	Both	TeProD Team/ Marketing and communication Department	Quarterly, starting Q3 2025

Activity	Dimension	Who	When
Set up pilot projects on green campus initiatives (e.g., recycling, solar)	Green	Centre for Grants management, Consultancy and resource mobilization/ Directorate of Postgraduate Studies and research	Pilot by Q1 2026, expand by 2027
Publish and Present papers to conferences, seminars on twin transition	Both	Directorate of Postgraduate Studies and research	Annually starting Q1 2026
Secure funding for green and digital projects through grants and partnerships	Both	Centre for Grants management, Consultancy and resource mobilization/ Directorate of Postgraduate Studies and research	Apply from Q3 2026, ongoing

3.7 Annexes

Annex 1. List of study programmes related to green and digital transition

Name of study Programme	Faculty	Level BSc/MSc/PhD.
Master of Science in Integrated Environmental Management and Sustainable Development	Faculty of Environmental Management and Sustainability Science	MSc
Master of Science in Sustainable Ocean and Aquaculture Management	Faculty of Environmental Management and Sustainability Science	MSc
Master of Science in Conservation Agricultural Management	Faculty of Environmental Management and Sustainability Science	MSc
Bachelor of Education in Secondary Education Honours	Education	BEd (Hons)
Master of Education in Mathematics and Science Education	Education	MEd
Master of Science in Information Technology	ICT	MSc
Postgraduate Diploma in Data Science	ICT	PGD

Annex 2. List of courses/subjects related to green and digital transition

Name of course/subject	Name of study Programme	Faculty	Level BSc/MSc/PhD.
Integrated Environmental Management	Master of Science in Integrated Environmental Management and Sustainable Development	Faculty of Environmental Management and Sustainability Science	**MSc**
Climate Change Vulnerability, Mitigation and Adaptation	Master of Science in Sustainable Ocean and Aquaculture Management	Faculty of Environmental Management and Sustainability Science	**MSc**
Sustainable Agriculture	Master of Science in Conservation Agricultural Management	Faculty of Environmental Management and Sustainability Science	**MSc**
Computer Science Education	Bachelor of Education in Secondary Education Honours	Education	**BEd**
E-Learning and Digital Technologies in Education	Master of Education in Mathematics and Science Education	Education	**MEd**
Information Systems Strategy	Master of Science in Information Technology	ICT	**MSc**
Introduction to Artificial Intelligence	Postgraduate Diploma in Data Science	ICT	**PGD**

4 The Methodology for Local Industry Needs and HEIs Knowledge Gap Specification

4.1 Overview

The methodology provides a robust framework for analysing the current state of Higher Education Institutions (HEIs) in Ghana and Namibia, as well as for identifying critical needs. It forms an integral part of the Work Package focused on planning, defining activities, and designing training materials that support the project's overarching goals.

The analysis addresses the following areas:

- **Skill Gaps Identified by Employers** – Investigating essential labour market skills currently lacking among graduates.
- **Teachers' Proficiency in AI Tools** – Assessing the ability of teachers to integrate artificial intelligence into their teaching practices.
- **Content Needs in Key Areas** – Evaluating knowledge gaps related to the circular economy and the effective use of digital tools to enhance productivity.
- **Student Skill Development** – Exploring opportunities to prepare students and student-teachers for sustainable and innovation-oriented careers.

This methodology lays the groundwork for aligning curricula with industry requirements and for bridging educational gaps to support the outcomes of the twin transition.

Tasks and Deliverables Supported by the Methodology

The proposed methodology underpins the implementation of the following tasks:

- Co-creation workshops on digitalisation and the green transition
- Pedagogical co-creation workshops
- Workshops on innovative uses of AI and digital tools in education
- University-specific curriculum design
- Development of personal development roadmaps
- Customisation of AI and digital tools for educational purposes
- Creation, updating, and adaptation of university-specific courses

These tasks will contribute to the following deliverables:

- Updated, university-specific curricula
- Personal development roadmaps
- A handbook for teacher trainers, incorporating customised AI and digital tools for education
- University-specific courses
- Peer Group Action Plan (PGAP) for the twin transition

This methodology establishes a solid foundation for achieving the TeProD project's strategic objectives. By identifying knowledge gaps and aligning training materials with industry and academic needs, the project seeks to enhance the twin transition capacities of Ghanaian and Namibian HEIs—paving the way for sustainable development and innovative educational practices.

4.2 Methodology for the Local industry needs, and HEIs knowledge gap specification

Each TeProD project partner country HEI will undergo the self-assessment. Altogether 3 self-assessments will be performed in two partner countries (Namibia and Ghana). Based on these three Reports **"Local industry needs, and HEIs knowledge gap specification reports"** will be prepared (D2.1).

The self-assessment will be conducted in **four steps**, engaging various **stakeholders**:

1. Higher Education Institution (HEI) as an Institution
   Conducted by top management, teachers, and academic leadership.
2. HEI – Teachers
   Focused specifically on the perspectives and preparedness of individual educators.
3. Local Industry Representatives
   Insights gathered from industry professionals to align education with real-world needs.
4. HEI – Students
   Focused specifically on the perspectives and preparedness of individual students.

Key Aspects of Research: The self-assessment will explore three critical dimensions:

1. Preparedness for Green Transition: GOING GREEN
   Evaluation of readiness to integrate sustainability and circular economy principles into practices and curricula.
2. Preparedness for Digital Transition: GOING DIGITAL
   Assessment of capabilities to adopt and implement digital tools and technologies in education and operations.
3. Preparedness for Twin Transition: GOING TWIN
   Analysis of the institution's overall readiness to harmonize green and digital transitions effectively.

4.3 The Sampling

The sampling has been decided based on size of the University (number of faculties, teachers, students). The basic facts on SSA HEIs:

University of Education Winneba, Ghana

- Number of faculties: 12
- Number of Employees: Total staff, including academic and administrative (about 700)
- Number of Students: regular (40,150); Sandwich and Distance education (27,560); Total number of current enrolment (about 70,000)
- Selection of the /Faculty for TeProD implementation
    - 6 faculties from 12
    - Number of students: 200 students at Bachelor and Master Level
    - Number of teachers: 100

University of Ghana, Accra, Ghana

- Number of colleges: 4
- Number of Employees: Total staff, including academic and administrative (about 6.400)
- Number of Students: about 74,000
- Selection of the /Faculty for TeProD implementation
    - 3 colleges from 4 (Colleges of Education, Humanities and Basic and Applied Science)
    - Number of students: at least 200 at Bachelor and Master level
    - Number of teachers: up to 100

The International University of Management, Windhoek, Namibia

- Number of faculties and schools: 6
- Number of Employees: Total staff, including academic and administrative (about 465)
- Number of Students: about 19.600
- Selection of the /Faculty for TeProD implementation
    - 1 college: School of Primary Education and School of Secondary and Postgraduate Education
    - Number of students: at least 100 at Bachelor. and Master Level
    - Number of teachers: at least 50

4.4 Self-assessment steps

4.4.1 Self-assessment step 1: Higher Education Institution as an Institution

The target groups depend on **managerial structure** of the HEI and is defined as follows:

The recommended number of participants:

- Top managers and decision makers at university level (at least 2 persons at university level)
- Dean or vice-dean of each HEI Faculties (1 per faculty)

- 5 Professors/Teachers per faculty (preferably involved in administration e.g. Head of Departments or faculty Academic and Scientific Bodies)

The Introduction to questionnaire:

Dear Participant,

In line with our university's commitment to excellence in education, research, and operational practices, we are conducting a self-assessment to evaluate our preparedness for key transitions shaping the future of academia and society. This survey is part of the Erasmus+ project titled **Improving Teachers and Students Professional Development with Twin Transition in Sub-Saharan Africa** (project number 101177880 — TeProD — ERASMUS-EDU-2024-CBHE).

The self-assessment seeks to gather perspectives from top management, teachers, and academic leadership on our preparedness for the **Twin Transition**. Specifically, it examines the university's overall readiness to harmonize green and digital transitions, fostering synergy and long-term resilience in an ever-evolving environment.

Your valuable input will help identify strengths, challenges, and areas for improvement, enabling us to align strategies with transformative goals and enhance professional development opportunities for teachers and students.

Thank you for your participation and for contributing to this vital initiative.

Which university are you currently working at?

- University of Ghana, Ghana
- The University of Education, Winneba, Ghana
- International University of Management, Namibia

What area(s) of university management are you currently involved in? (You may select more than one.)

- Strategic Planning
- Academic Affairs
- Research and Innovation
- Student Affairs
- Human Resources
- Finance and Budgeting
- External Relations and Partnerships
- Quality Assurance
- Institutional Development
- Other (please specify): _____

HEI: Key Aspect 1: GOING GREEN: Supporting Sustainable Goals

Respondents will rate their level of agreement with the following statements on a scale, such as:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Institutional Strategy and Leadership

1. The HEI has a formal strategy that explicitly addresses sustainability issues (e.g., energy, waste reduction, curriculum integration).
2. Institutional leadership actively promotes sustainability through policies and actions.
3. The green transition is clearly prioritized in the HEI's mission, vision, and strategic goals.
4. Sufficient financial and human resources are allocated to support sustainability initiatives.

Curriculum and Education

1. The HEI provides learning programs that integrate sustainability competences, such as knowledge about energy conservation and skills in waste reduction.
2. The HEI offers courses or programs that explicitly address green occupations, such as environmental management, photovoltaic installation, or recycling.
3. Teachers are trained to incorporate green skills and sustainable practices into their teaching.
4. The HEI systematically develops skills in green technologies, such as solar, wind power, insulation, or electric batteries.
5. Students are actively engaged in learning activities that focus on sustainability and green technologies.

Research and Innovation

1. The HEI promotes research that addresses environmental challenges and supports the development of green technologies.
2. Research outcomes related to sustainability are applied within the institution's operations and strategies.
3. The HEI collaborates with industry, research institutes, or NGOs on sustainability projects and programs.

Operations and Campus Infrastructure

1. The HEI's operations demonstrate a commitment to sustainability, such as reducing its environmental footprint or using renewable energy.

2. The HEI invests in infrastructure that supports sustainable practices, like energy-efficient systems and green technologies.
3. Sustainability is integrated into the HEI's decision-making process regarding operations and infrastructure.
4. Digital tools support and enhance educational processes.
5. Digital tools provide sufficient reliable data to support decision-making.

Collaboration and Stakeholder Engagement

1. The HEI collaborates with industry or sector associations to provide training programs focused on sustainability and green occupations.
2. The HEI partners with other institutions or stakeholders (e.g., local governments, employers) to drive sustainability initiatives and meet collective sustainability goals.
3. Students and staff are encouraged to collaborate on sustainability projects that contribute to green transformation.

Monitoring and Evaluation

1. Measurable indicators are used to track the HEI's progress toward sustainability and green transition goals.
2. The HEI regularly reviews and updates its sustainability goals to ensure they align with national and international targets.

Open Question (OQ):

What are the key challenges your institution faces in advancing its digital transformation, and what additional support or resources would help overcome these challenges?

HEI: Key Aspect 2: GOING DIGITAL: Embracing Technology for Innovation

Respondents will rate their level of agreement with the following statements on a scale, such as:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Institutional Strategy and Leadership

1. Our institution has a formal strategy or policy for advancing digital transformation.
2. Leadership regularly assesses and updates the institution's digital transition strategy.
3. Institutional leaders actively promote the use of digital tools and technologies.

4. Digital transformation is a clear priority in the institution's mission and vision.
5. Sufficient financial and human resources are allocated to support digital initiatives.
6. The institution provides funding for the development or acquisition of digital tools.

Curriculum and Education

1. Digital skills and literacy are effectively incorporated into the curriculum.
2. Dedicated courses or programs focus on digital transformation and emerging technologies.
3. Teachers are well-equipped to utilize digital tools in their teaching practices.
4. Professional development or training on digital education tools and strategies is readily available for staff.
5. Students are encouraged to engage with digital technologies in their learning activities.
6. Formal mechanisms exist to include students' perspectives on digital education in curriculum development.
7. Digital tools facilitate the work of teachers by reducing work steps or mental load.

Operations and Infrastructure

1. The institution has the necessary infrastructure (e.g., high-speed internet, smart classrooms, digital labs) to support digital education.
2. Digital systems and platforms are regularly updated and maintained.
3. Digital tools and resources are accessible to all students, including those with disabilities.
4. Measures are in place to address the digital divide among students and staff.

Research and Collaboration

1. The institution conducts research programs or projects focused on digital technologies and their applications.
2. Research outcomes related to digital transformation are regularly applied within the institution.
3. The institution collaborates with industry, tech companies, or other organizations on digital initiatives.
4. Formal partnerships exist to enhance digital education and practices.

Monitoring and Evaluation

1. Measurable indicators are in place to track progress on digital transition goals.
2. These indicators are reviewed frequently, and mechanisms ensure accountability.
3. Feedback is collected from staff, students, and stakeholders on digital initiatives.
4. Feedback is used to refine or enhance the institution's digital strategies.

Open Question:

What are the key challenges your institution faces in advancing its digital transformation, and what additional support or resources would help overcome these challenges?

HEI: Key Aspect 3: TWIN TRANSITION: Integrating Digital and Green for a Sustainable Future

Respondents will rate their level of agreement with the following statements on a scale, such as:

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Institutional Strategy and Leadership

1. Our institution has a formal strategy that integrates green and digital transformation to support the twin transition.
2. Institutional leadership actively promotes cross-disciplinary efforts that align green and digital objectives.
3. The twin transition is clearly reflected in the institution's mission, vision, and strategic priorities.
4. Financial and human resources are allocated specifically for initiatives that combine green and digital transformation.

Curriculum and Education

1. Twin transition topics (e.g., green innovation through digital tools, circular economy enhanced by AI) are systematically integrated into the curriculum.
2. Students are encouraged to develop interdisciplinary skills that address both sustainability and digitalization challenges.
3. The institution offers programs or courses specifically designed to teach the interconnected aspects of twin transition.
4. Teachers are trained to apply digital tools that enable green practices and teach interdisciplinary concepts related to twin transition.
5. Professional development opportunities focus on the synergy between green and digital skills for educators.

Research and Innovation

1. The institution actively promotes research projects that explore the interplay between green and digital transformation.
2. Research outcomes are applied to institutional practices, such as using AI for energy efficiency or digital platforms for sustainability initiatives.
3. Partnerships with industry, government, or other organizations focus on innovative projects that advance twin transition objectives.

Operations and Campus Infrastructure

1. The institution's operations demonstrate a combined approach to sustainability and digitalization (e.g., smart energy systems, digital waste tracking).
2. Investments in campus infrastructure support the integration of green and digital technologies (e.g., renewable energy systems managed by IoT).
3. The institution actively explores and implements eco-friendly digital technologies.

Collaboration and Engagement

1. The institution encourages collaboration among disciplines to address twin transition challenges.
2. Stakeholders (e.g., staff, students, industry partners) are engaged in initiatives that demonstrate the twin transition in practice.
3. Students participate in projects that showcase real-world applications of twin transition concepts, such as digital solutions for sustainable development.

Monitoring and Evaluation

1. Measurable indicators are in place to track the integration of green and digital objectives within institutional strategies.
2. Progress on twin transition goals is reviewed regularly, and outcomes are used to improve institutional policies.
3. Stakeholder feedback is gathered to assess the impact and effectiveness of twin transition efforts.
4. The institution evaluates the potential trade-offs and synergies between green and digital strategies to optimize outcomes.

Open Question:

How does your institution ensure the successful integration of green and digital transformation, and what additional measures could strengthen the synergy between these transitions?

4.4.2 Self-assessment step 2: Higher Education Teachers

The sampling of target groups depends on the structure of the HEI and are defined as follows:

- University of Education Winneba, Ghana: Minimum requirements
    - Number of teachers: at least 100 at Bachelor and Master levels
- University of Ghana, Accra, Ghana: Minimum requirements
    - Number of teachers: up to 100 at Bachelor and Master levels
- The International University of Management, Windhoek, Namibia: Minimum requirements
    - Number of teachers: at least 50 at Bachelor and Master levels

The Introduction to questionnaire:

Dear Participant,

As part of our university's commitment to excellence in education, research, and operational practices, we are conducting a self-assessment to evaluate the preparedness of individual educators for key transitions shaping the future of academia and society. This survey is part of the Erasmus+ project titled Improving Teachers and Students Professional Development with Twin Transition in Sub-Saharan Africa (project number 101177880 — TeProD — ERASMUS-EDU-2024-CBHE).

This self-assessment focuses specifically on understanding your perspectives and readiness for the Twin Transition. It aims to explore how prepared educators are to harmonize green and digital transitions in their teaching practices, fostering synergy and long-term resilience in an evolving educational landscape.

Your insights are essential in identifying strengths, challenges, and opportunities to align strategies with transformative goals and enhance professional development tailored to educators' needs.

Thank you for your participation and for contributing to this important initiative.

Which university are you currently teaching at?

- University of Ghana, Ghana
- The University of Education, Winneba, Ghana
- International University of Management, Namibia

What subject(s) are you currently teaching? (You may select more than one.)

- Mathematics
- Physics
- Chemistry
- Biology
- Computer Science
- Environmental Science
- Economics
- Business Studies
- Literature
- History
- Geography
- Psychology
- Sociology
- Engineering (please specify): _____

- Medicine/Health Sciences (please specify): _____
- Arts (please specify): _____
- Education
- Management
- Other (please specify): _____

HET: Key aspect 1: GOING GREEN: Supporting Sustainable Goals

1. **Do you understand the concept of the green transition and its relevance to your subject area?**
   - [ ] Yes, thoroughly
   - [ ] Somewhat
   - [ ] No, not really
2. **Are you familiar with the key principles of sustainability and environmental responsibility in higher education?**
   - [ ] Yes, very familiar
   - [ ] Partially familiar
   - [ ] No, not familiar
3. **How would you rate your knowledge and understanding of the following components of the green transition?**
   (Please rate each area from 1 to 5, where 1 = No knowledge, 5 = Expert-level knowledge)
   - Climate Change and Mitigation Strategies
   - Sustainable Energy Systems (renewable energy, energy efficiency)
   - Circular Economy and Waste Management
   - Biodiversity and Ecosystem Protection
   - Sustainable Agriculture and Food Systems
   - Social Sustainability and Green Jobs
   - Sustainability science (e.g. science related to climate change)
4. **Do you incorporate sustainability topics into your teaching materials and pedagogical methods?**
   - [ ] Frequently
   - [ ] Occasionally
   - [ ] Rarely or never
5. **Have you adapted your syllabus to include examples of green practices or technologies relevant to your discipline?**
   - [ ] Yes, extensively
   - [ ] To some extent
   - [ ] Not at all

6. **Do you assign projects or tasks that encourage students to consider environmental impacts or solutions?**
   - [ ] Always
   - [ ] Sometimes
   - [ ] Rarely or never
7. **How confident are you in teaching concepts related to sustainability, climate change, and green technologies?**
   - [ ] Very confident
   - [ ] Moderately confident
   - [ ] Not confident
8. **Can you explain the role of your field in achieving sustainability goals, such as the SDGs or carbon neutrality?**
   - [ ] Yes, comprehensively
   - [ ] To some extent
   - [ ] No, not at all
9. **Have you developed or implemented teaching strategies that minimize environmental impact (e.g., paperless teaching, energy-efficient labs)?**
   - [ ] Yes
   - [ ] No
10. **Do you collaborate with colleagues or other departments to promote sustainability in education?**
    - [ ] Frequently
    - [ ] Occasionally
    - [ ] Rarely or never
11. **Have you engaged with external stakeholders (e.g., industries, NGOs) to bring real-world green transition insights into your teaching?**
    - [ ] Yes
    - [ ] No
12. **Do you encourage students to participate in sustainability-related projects, initiatives, or organizations?**
    - [ ] Frequently
    - [ ] Occasionally
    - [ ] Rarely or never
13. **What are the main challenges you face in integrating green transition topics into your teaching? (Select all that apply)**
    - [ ] Lack of resources or materials

- [ ] Insufficient training
- [ ] Limited time in the curriculum
- [ ] Lack of interest from students
- [ ] Other: _____

14. What opportunities do you see for improving your teaching practices to better align with green transition goals?

- [ ] Access to training programs
- [ ] Availability of teaching materials
- [ ] Institutional support for sustainability initiatives
- [ ] Collaboration with peers and external partners
- [ ] Other: _____

15. On a scale of 1 to 5, how prepared do you feel to contribute to the green transition in your role as a university teacher?

- [ ] 1 (Not prepared at all)
- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 5 (Very well prepared)

16. What steps are you willing to take to improve your preparedness for the green transition?

- [ ] Attend training programs
- [ ] Redesign course content
- [ ] Collaborate with sustainability initiatives
- [ ] Other: _____

Open Question:

What additional support or resources would help you enhance your ability to teach and contribute to the green transition in your discipline?

HET: Key aspect 2: GOING DIGITAL: Embracing Technology for Innovation

1. How familiar are you with the concept of the digital transition and its implications for higher education?

- [ ] Not at all familiar
- [ ] Somewhat familiar
- [ ] Familiar
- [ ] Very familiar

2. How well do you understand the role of digital technologies (e.g., AI, big data, blockchain) in shaping education and research?

- [ ] I have no understanding
- [ ] I have a basic understanding
- [ ] I understand it well
- [ ] I can explain it and provide examples

3. Are you aware of global and national strategies related to digital transformation in education?

- [ ] Not aware
- [ ] Slightly aware
- [ ] Generally aware
- [ ] Well-informed

4. How often do you use digital tools (e.g., LMS platforms, collaboration software) in your teaching?

- [ ] Never
- [ ] Rarely
- [ ] Frequently
- [ ] Always

5. How would you rate your knowledge and understanding of the following components of the digital transition?

(Please rate each area from 1 to 5, where 1 = No knowledge, 5 = Expert-level knowledge)

- Digital Tools for Teaching and Learning (e.g., LMS, educational apps, virtual classrooms)
- Data Analytics and Learning Management Systems (LMS)
- Artificial Intelligence (AI) and its potential applications in education
- Online Learning and Blended Teaching Methods
- Digital Assessment Tools (e.g., quizzes, exams, peer reviews)
- Cybersecurity and Data Privacy in Education

- Collaboration and Communication Tools (e.g., video conferencing, discussion boards)

6. How confident are you in using the following tools for teaching?

- Learning Management Systems (LMS) (e.g., Moodle, Canvas)
  - [ ] Not confident
  - [ ] Somewhat confident
  - [ ] Confident
  - [ ] Very confident
- Video conferencing platforms (e.g., Zoom, Teams)
  - [ ] Not confident
  - [ ] Somewhat confident
  - [ ] Confident
  - [ ] Very confident
- Online assessment tools (e.g., Google Forms, Kahoot)
  - [ ] Not confident
  - [ ] Somewhat confident
  - [ ] Confident
  - [ ] Very confident

7. Do you personally use AI for:

- [ ] Never
- [ ] Rarely
- [ ] Frequently
- [ ] Always

- **Personalized Learning**: to analyze student data and help create tailored learning experiences, recommending resources or adjusting content based on individual needs.
- **Grading and Assessment**: to assist in grading assignments, quizzes, and exams, especially for multiple-choice or standardized tests, saving time and providing instant feedback.
- **Content Creation:** in generating teaching materials, such as presentations, quizzes, or lesson plans, based on the course content.
- **Tutoring and Support**: to provide students with immediate answers to common questions, homework assistance, or clarifications outside class hours.
- **Data Analytics:** to analyze student performance data to identify trends, predict student success or dropout rates, and suggest interventions for underperforming students.

- **Language Translation and Support**: to manage diverse classrooms by offering translation services, enhancing communication with non-native speakers.
- **Classroom Management:** to monitor student engagement in online classes or provide insights into which students might need additional support based on their participation or performance.
- **Research:** for literature reviews, data analysis, generating research hypotheses, helping teachers stay up-to-date in their fields., project proposal writing
- **Administrative Tasks:** to streamline administrative duties, such as scheduling, organizing materials, or responding to routine student inquiries, allowing teachers to focus more on pedagogy.
- **Virtual or Augmented Reality:** to simulate real-world scenarios for experiential learning in fields like medicine, engineering, and science.

8. Do you encourage your students to use digital collaboration tools for group projects or discussions?

- [ ] Never
- [ ] Rarely
- [ ] Sometimes
- [ ] Often

9. How confident are you in using digital tools to conduct research (e.g., reference managers, data analysis software)?

- [ ] Not confident
- [ ] Somewhat confident
- [ ] Confident
- [ ] Very confident

10. Do you actively use open educational resources (OER) or contribute to digital content creation for teaching and research?

- [ ] Never
- [ ] Rarely
- [ ] Occasionally
- [ ] Regularly

11. Are you familiar with cybersecurity practices to protect your digital work and data?

- [ ] Not at all
- [ ] Somewhat familiar
- [ ] Familiar
- [ ] Very familiar

12. Which digital skills or tools do you feel you need further training in?

- [ ] Advanced use of LMS platforms
- [ ] AI and machine learning applications in education
- [ ] Digital assessment and feedback tools
- [ ] Cybersecurity and data protection
- [ ] Virtual and augmented reality tools
- [ ] other, please add

13. How motivated are you to adopt digital tools and methods in your teaching?

- [ ] Not motivated
- [ ] Slightly motivated
- [ ] Moderately motivated
- [ ] Highly motivated

Open Question:

What challenges do you face in integrating digital tools into your teaching, and what support or resources would help you address them?

HET: Key aspect 3: TWIN TRANSITION: Integrating Digital and Green for Future Education

What is the Twin Transition?

The twin transition refers to the combined process of digital transformation and green transition working together to create sustainable, technology-driven solutions. It is not simply about addressing sustainability and digitalization as separate topics, but about understanding how they influence and complement each other. The aim is to create a more sustainable future through the intelligent use of technology, and to use digital solutions to support green goals.

1. How do you perceive the integration of digital and green transitions in higher education?
   - They are separate issues
   - They are somewhat interconnected
   - They are highly interconnected
   - I don't know
1. Have you considered how digital technologies can support sustainability in your teaching or research?
   - Yes, frequently
   - Occasionally
   - No
2. Do you incorporate digital tools to help students explore sustainable solutions or the green transition?
   - Frequently

- Occasionally
- Never

3. How important do you think it is to integrate the twin transition into higher education curricula?
   - Not important
   - Somewhat important
   - Very important
4. Do you understand the concept of the twin transition as an integrated process, where digital transformation and sustainability support each other?
   - Yes, thoroughly
   - Somewhat
   - No, not really
5. Are you familiar with how digital transformation can enhance sustainability efforts and vice versa in your subject area?
   - Yes, very familiar
   - Partially familiar
   - No, not familiar
6. Do you incorporate both the principles of digital transformation and sustainability as interrelated concepts in your teaching?
   - Frequently
   - Occasionally
   - Rarely or never
7. Have you adapted your syllabus to include examples of how digital technologies contribute to sustainability and how sustainability goals can drive digital innovation?
   - Yes, extensively
   - To some extent
   - Not at all
8. Do you assign projects or tasks that encourage students to consider how digital solutions can contribute to environmental sustainability or how sustainability drives technological innovation?
   - Always
   - Sometimes
   - Rarely or never
9. How confident are you in teaching integrated concepts of digital transformation and sustainability, where both areas are addressed together to achieve a shared goal?
   - Very confident
   - Moderately confident
   - Not confident
10. Can you explain how digital transformation and sustainability are interrelated in achieving long-term societal and environmental goals?
    - Yes, comprehensively

- To some extent
- No, not at all

11. Have you developed or implemented teaching strategies that combine both green practices and digital technologies to address complex, real-world problems?
    - Yes
    - No
12. Do you collaborate with colleagues or other departments to integrate both digital and sustainability topics into the curriculum?
    - Frequently
    - Occasionally
    - Rarely or never
13. Have you engaged with external stakeholders (e.g., industries, tech companies, environmental organizations) to bring insights on how digital transformation and sustainability can work together?
    - Yes
    - No
14. Do you encourage students to participate in projects or initiatives that address both digital and sustainability challenges in an integrated manner?
    - Frequently
    - Occasionally
    - Rarely or never
15. What are the main challenges you face in integrating both digital transformation and sustainability together in your teaching?
    - Lack of resources or materials
    - Insufficient training on the integration of both topics
    - Limited access to technology or digital tools
    - Limited time to cover both topics adequately
    - Lack of student interest or resistance
    - Other: _____
16. What opportunities do you see for improving your teaching practices to better align with the integrated goals of the twin transition?
    - Access to more training programs
    - Availability of integrated teaching materials
    - Institutional support for both sustainability and digital initiatives
    - Collaboration with peers and external partners working on both areas
    - Other: _____
17. On a scale of 1 to 5, how prepared do you feel to contribute to the twin transition in your role as a university teacher?
    - 1 (Not prepared at all)
    - 2
    - 3

- 4
- 5 (Very well prepared)

18. What steps are you willing to take to improve your preparedness for contributing to the twin transition?
    - Attend training programs focused on both green and digital topics
    - Redesign course content to address both areas together
    - Collaborate with twin transition initiatives and projects
    - Other: _____
19. How would you rate your understanding of the following integrated concepts essential for the twin transition?

(Rate from 1 to 5, where 1 = No knowledge, 5 = Expert-level knowledge)

- Understanding the interconnection between digital transformation and sustainability
- Innovative use of digital technologies in creating sustainable solutions
- Approaches to teaching that combine digital and sustainability concepts
- Knowledge of policies, frameworks, and initiatives promoting the twin transition
- Ability to assess and communicate the impact of digital transformation on sustainability

Open Question: What additional support or resources would help you enhance your ability to teach and contribute to the integrated twin transition in your discipline?

4.4.3 Self-assessment step 3: Local Industry Representatives

The SSA HEIs will select the most suitable approach to achieve the desired outcomes:

Option 1: Focus Group Discussion with Employers

- Conduct **a focus group discussion involving 10 key employers** of HEI graduates, represented by HR professionals or top managers.
- The discussion will examine the preparedness of university graduates for the green and digital transitions.

Option 2: Individual Interviews with Employers

- Conduct 10 individual interviews with key employers of HEI graduates, represented by HR professionals or top managers.
- The interviews will gather insights into employer perspectives on the readiness of university graduates for the green and digital transitions.

Option 3: Combination of Focus Groups and Individual Interviews

- Use a mixed-method approach, combining individual interviews and a focus group discussion with key employers of HEI graduates.
- A total of 10 employers will be engaged, leveraging the most effective combination to ensure robust results.

QUESTIONS:

1. Current Workforce Skills:

- What are the key skills and competencies you expect from university graduates in your organization?
- How would you rate the current readiness of graduates to meet your expectations?

2. Awareness of Transitions:

- How aware do you think graduates are of the green and digital transitions?
- Do you observe an understanding of sustainable practices and digital tools in their approach to work?

3. Green Skills:

- What specific green skills do you think are essential for graduates entering your industry?
- Are you satisfied with their knowledge and application of sustainability principles?

4. Challenges:

- Have you faced challenges in integrating graduates into roles requiring environmental or sustainability-related knowledge?

5. Suggestions for Improvement:

- How can universities better prepare graduates for jobs focusing on environmental and sustainability goals?

6. Digital Competencies:

- What are the most critical digital skills graduates should have in your field (e.g., data analysis, AI, digital tools)?
- How well-equipped are graduates with these skills when they join your organization?

7. Adaptability:

- How adaptable are graduates to emerging digital technologies in the workplace?
- Are they prepared for roles that involve continuous learning in digital advancements?

8. Gaps in Education:

- What specific gaps do you see in the digital education of graduates?
- How can universities collaborate with employers to address these gaps?

9. Cross-Sector Skills:

- Do graduates demonstrate the ability to integrate green and digital skills (e.g., using digital tools for environmental monitoring or efficiency)?

- Can you share examples of where this integration has been successfully applied or lacking?

10. Future Needs:

- What upcoming trends in green and digital transitions should universities consider when designing curricula?
- What are the potential roles in your organization where graduates with combined green and digital expertise will be most valuable?

11. Partnerships:

- Are you currently involved in partnerships or collaborations with universities to shape curricula or training programs?
- If not, would you be interested, and in what capacity?

12. Feedback Mechanisms:

- How can employers like you provide feedback to universities to ensure curricula stay aligned with industry needs?
- Do you think internships, co-op programs, or industry-led workshops are effective in addressing the readiness gap?

13. Actionable Suggestions:

- What are the top three changes universities should make to improve graduate readiness for the future workforce?

4.4.4 Self-assessment step 4: Higher Education Students

This step has been added to the self-assessment as a means of verifying the completion of the project goals, which includes students' self-assessment of their understanding of the twin transition both before and after the project.

The sampling of target groups depends on the structure of the HEI and are defined as follows:

- University of Education Winneba, Ghana: Minimum requirements
    - Number of students: 200 at Bachelor and Master level
- University of Ghana, Accra, Ghana: Minimum requirements
    - Number of students: 200 at Bachelor and Master level
- The International University of Management, Windhoek, Namibia: Minimum requirements
    - Number of students: 120 at Bachelor and Master level

The Self-Assessment of Students' Capabilities and Satisfaction with Twin Transition Education

Dear Student,

We are conducting this survey to understand how well the current education system prepares students for the challenges and opportunities presented by the twin transition — the simultaneous processes of digital transformation and green transition. These two interconnected transitions are shaping the future of work, society, and the environment, and it is essential that educational programs help students develop the skills and knowledge needed to thrive in this new era.

The purpose of this questionnaire is to assess your understanding of the twin transition, your preparedness for these changes, and your level of satisfaction with the courses related to these topics. Your feedback is crucial in identifying areas for improvement and enhancing future educational offerings.

This survey is part of the Erasmus+ project titled Improving Teachers and Students Professional Development with Twin Transition in Sub-Saharan Africa (project number 101177880 — TeProD — ERASMUS-EDU-2024-CBHE).

What is the Twin Transition?

The twin transition refers to the combined shift towards digitalization (such as AI, data science, and digital technologies) and environmental sustainability (including efforts to combat climate change, promote renewable energy, and adopt circular economy principles). These transitions are essential for building a more sustainable, inclusive, and technologically advanced society. The goal is to ensure that future generations are equipped to tackle global challenges through both technological innovation and responsible environmental stewardship.

Section 1: General Information

Which university are you currently studying at?

- University of Ghana, Ghana
- The University of Education, Winneba, Ghana
- International University of Management, Namibia

What is your current level of study?

- Undergraduate (BSc or equivalent)
- Graduate (MSc or equivalent)
- Doctoral (PhD or equivalent)
- Other: _____

What field of study are you currently pursuing?

- Business and Management
- Engineering
- Environmental Science
- Information Technology and Computer Science

- Social Sciences
- Humanities
- Education
- Natural Sciences
- Arts and Design
- Medicine and Health Sciences
- Law
- Mathematics and Statistics
- Architecture
- Agriculture and Forestry
- Economics
- Other: _____

Section 2: Understanding of Twin Transition (Digital & Green Transitions)

How familiar are you with the concept of "twin transition" (digital and green)?

- Not familiar at all
- Slightly familiar
- Moderately familiar
- Very familiar

Do you feel that your education adequately prepares you for the challenges of both the digital and green transitions?

- Yes
- No
- Not sure

Which aspect of the twin transition do you feel more prepared for?

- Digital transformation (AI, IoT, etc.)
- Green transformation (sustainability, renewable energy, etc.)
- Both equally
- Neither

Section 3: Training and Curriculum

How satisfied are you with the content of courses related to the twin transition?

- Very dissatisfied
- Dissatisfied
- Neutral
- Satisfied
- Very satisfied

- No course offered on twin transition

Do the current courses provide you with practical skills to apply the knowledge gained in the twin transition (e.g., through case studies, hands-on projects)?

- No, not at all
- To some extent
- Yes, a lot

Which areas do you feel need more focus in your curriculum regarding the twin transition? (Select all that apply)

- Digital technologies (AI, data science, cybersecurity, etc.)
- Environmental sustainability (climate change, renewable energy, circular economy, etc.)
- Green technologies and innovation
- Integration of digital tools for sustainability
- Policy and governance for twin transition
- Social impact of twin transition (inclusion, equality, and community engagement)
- Ethical considerations in digital and green transitions
- Skills for interdisciplinary collaboration and problem-solving
- Entrepreneurship and innovation for sustainable development
- Lifelong learning and adaptability in the twin transition context

Section 4: Skills and Competencies

Green Transition Skills

Rate your agreement with the following statements (1 = Strongly Disagree, 5 = Strongly Agree):

- I understand how environmental, social, and economic systems are interconnected.
- I can analyze environmental challenges and propose practical solutions.
- I make choices in my daily life that reduce my environmental impact.
- I can anticipate the long-term effects of human activities on the environment and society.
- I understand the principles of the circular economy and apply them in my projects or studies.
- I am knowledgeable about the causes and consequences of climate change.
- I am confident in working collaboratively to achieve sustainability goals in group projects or community activities.
- I can critically evaluate policies or practices that affect sustainability.
- I am able to advocate for sustainability in my personal and professional interactions.
- I feel prepared to contribute to achieving global sustainability goals in my field of study.

Digital Transition Skills

Rate your agreement with the following statements (1 = Strongly Disagree, 5 = Strongly Agree):

- I am confident in finding, evaluating, and using digital information effectively.
- I can communicate and collaborate using digital tools in academic and professional settings.
- I am capable of creating, editing, and sharing digital content responsibly and ethically.
- I understand how to protect my digital identity and maintain cybersecurity.
- I can troubleshoot and solve technical problems independently using digital tools.
- I am aware of the ethical implications of digital technology use on society and the environment.
- I understand the basics of artificial intelligence, data analytics, and their applications.
- I am able to integrate digital tools to support sustainable practices and solutions.
- I can use digital technologies to enhance productivity and innovation in my field of study.
- I actively seek to improve my digital skills to stay updated with emerging technologies.

Do you feel confident in your ability to contribute to the digital and green transitions in your future career?

- Not confident
- Slightly confident
- Moderately confident
- Very confident

Which skills do you think are most important for the future workforce in relation to twin transition education? (Rank the following)

- Digital literacy and technological skills
- Environmental and sustainability knowledge
- Problem-solving and critical thinking
- Project management and leadership
- Communication and collaboration
- Other: _____

Section 5: Satisfaction and Engagement

How engaging do you find the teaching methods used in courses related to the twin transition?

- Not engaging at all
- Slightly engaging
- Moderately engaging
- Very engaging

Do you think there are enough resources (e.g., online tools, workshops, seminars) available to support your learning about the twin transition?

- No, not enough
- Yes, just enough
- Yes, more than enough

How well do your professors support your learning about the twin transition?

- Not well at all
- Somewhat well
- Well
- Very well

Would you like to see more real-world applications or collaboration with companies on twin transition topics?

- Yes
- No
- Maybe

Section 6: Feedback and Suggestions

What improvements would you suggest for the courses related to the twin transition? [Open-ended]

Do you feel that the twin transition topics are integrated across different subjects and fields of study?

- No, they are isolated
- To some extent
- Yes, they are well integrated

Any additional comments or suggestions for improving your education in relation to the twin transition?

[Open-ended]

5 Template: The Report on Local Industry Needs and Knowledge Gap Specification

General comments: Please provide average number for the period from 2020 to 2024. All questions are for the period 2023-2024, if not specified differently.

The Report on Local Industry Needs and Knowledge Gap Specification

University at a Glance

1. **Established Year:** The year the university was founded.
2. **Faculties:** Number and types of faculties or academic departments.
3. **Number of Employees:** Total staff, including academic and administrative.
4. **Number of Students:** Current enrolment numbers
5. **Number of Alumni:** Total alumni, potentially highlighting notable alumni.
6. Region of Operation:
    - Geographical location.
    - Role in the local economy (e.g., collaborations with industry, impact on regional development).
7. **Key Achievements or Rankings (Optional):** Any notable milestones, awards, or positions in international/national rankings.
8. **Research Focus:** Areas of specialization or unique programs.
9. **International Collaboration (Optional):** Partnerships, exchange programs, or involvement in international projects.
10. **Other Relevant Information:** Unique features, cultural significance, or institutional goals (e.g., commitment to sustainability or innovation).

University Organization and Management

Answer the following questions, providing your responses in a continuous narrative rather than separate paragraphs.

1. Human Resources at the University

How is the workforce distributed at your university?

a) Number of teaching faculty.

b) Number of researchers.

c) Number of non-academic staff (e.g., administrative, technical, support roles).

2. Type of Institution

What is the classification of your institution?

a) Private institution.

b) Public institution.

c) Mixed (public-private).

d) Other (please specify).

3. Quality Assurance Certification

Is your institution certified for quality assurance?

Yes/No

If yes, please specify the certification(s) (e.g., ISO, national accreditations).

4. Training for University Staff

Is training regularly offered to academic staff in the following areas?

- Best practices (e.g., industry standards, academic innovations).
- Teaching and Pedagogical Development
- Research Development
- Career and Leadership Skills
- Quality Assurance and Accreditation
- Internationalization and Collaboration
- Personal and Professional Well-Being
- Specialized Training for green transition
- Specialized Training for digital transition
- Other, please specify

Education

Answer the following questions, providing your responses in a continuous narrative rather than separate paragraphs.

1. Student Enrolment

What is the total number of students at your institution? Please provide a breakdown:

Bachelor's degree: ____

Master's degree: ____

PhD: ____

Postdoctoral researchers: ____ (if applicable).

2. Study Programs

What is the total number of study programs at your institution? Please provide details:

- Bachelor's programs: ____ (specify the number relevant for green and digital transition).
- Master's programs: ____ (specify the number relevant for green and digital transition).
- PhD programs: ____ (specify the number relevant for green and digital transition).
- Double degree programs: ____ (specify the number relevant for green and digital transition).

- Joint degree programs: ____ (specify the number relevant for green and digital transition).

Annex 1 . List of study programmes related to green and digital transition

Annex 2. List of courses/subjects related to green and digital transition

3. Accreditation

Are your study programs accredited?

- National accreditation: ____ (Yes/No).
- International accreditation: ____ (Yes/No).
- What percentage of your programs are accredited by international organizations? ____%.

4. Additional Educational Offerings

Does your institution provide the following educational opportunities?

- Free online courses or MOOCs: ____ (Yes/No, please specify the number relevant to the green and digital transition).
- Summer schools or short training courses (for staff or students): ____ (Yes/No, please specify the number relevant to the green and digital transition).
- New pedagogical models (e.g., ICT, e-learning, distance learning): ____ (Yes/No, please provide details).
- Other relevant to the green and digital transition.

Self- assessment of key dimensions

GOING GREEN: Supporting Sustainable Goals

Evaluation of readiness to integrate sustainability and circular economy principles into practices and curricula.

- University Self-Assessment Findings
- Teacher Self-Assessment Findings
- Student Self-Assessment Findings
- Findings from Employer Focus Groups/Interviews
- Summary of findings

The main measures to be taken in the next 3 years

Please indicate at least 5 measures to be taken by your HEI to improve green transition.

GOING DIGITAL: Embracing Technology for Innovation

Assessment of capabilities to adopt and implement digital tools and technologies in education and operations.

- University Self-Assessment Findings
- Teacher Self-Assessment Findings
- Student Self-Assessment Findings
- Findings from Employer Focus Groups/Interviews
- Summary of findings

The main measures to be taken in the next 3 years

Please indicate at least 5 measures to be taken by your HEI to improve digital transition.

TWIN TRANSITION: Integrating Digital and Green for Future Education

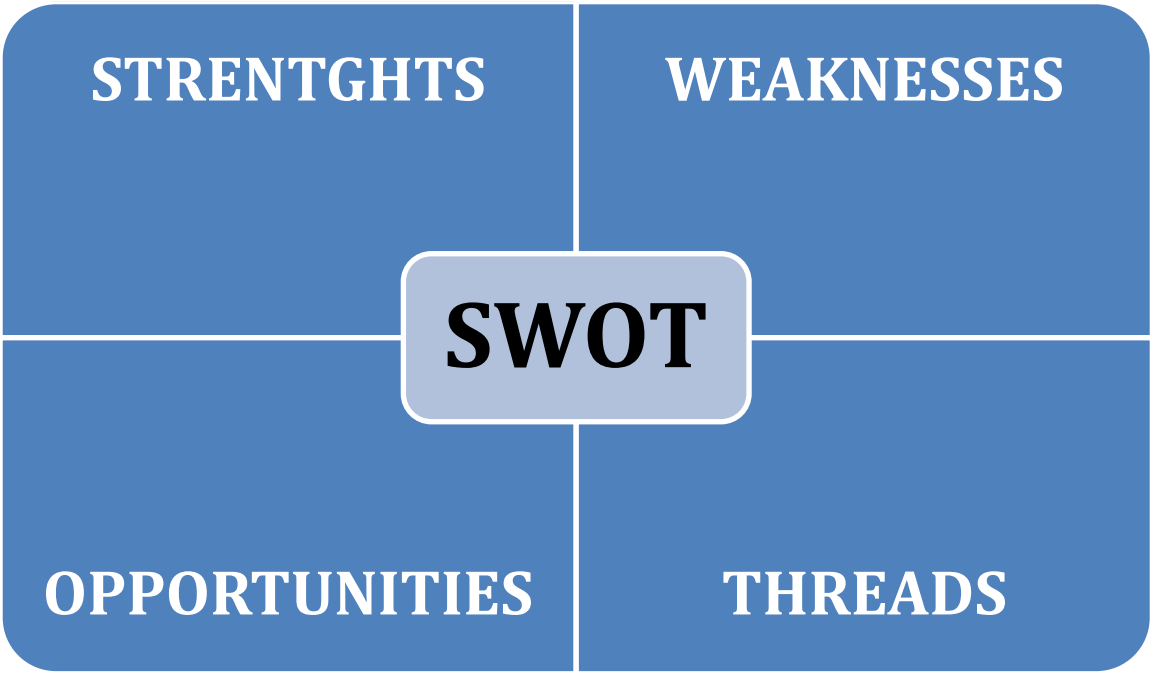
Analysis of the institution's overall readiness to harmonize green and digital transitions effectively.

- University Self-Assessment Findings
- Teacher Self-Assessment Findings
- Student Self-Assessment Findings
- Findings from Employer Focus Groups/Interviews
- Summary of findings

The main measures to be taken in the next 3 years

Please indicate at least 5 measures to be taken by your HEI to improve twin transition.

SWOT Analysis of Preparedness for the Twin Transition



The key areas for further intervention to enhance preparedness for the Twin Transition.

Please select and prioritize least 10 activities which can be done by your HEI till end of 2027.

Activity	Dimension	Who	When

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