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Exploring Digital Learning Opportunities and Challenges in Higher Education Institutes: Stakeholder Analysis on the Use of Social Media for Effective Sustainability of Learning–Teaching–Assessment in a University Setting in Qatar

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Abstract: The use of social media (SM) platforms in higher education has seen significant growth since the global pandemic disrupted traditional learning methods and forced stakeholders to explore alternatives. This trend is expected to continue with the rise of newer digital learning platforms, tools, programs and pedagogies, particularly within the context of the Fourth Industrial Revolution and the evolution towards Education 4.0 and Education 5.0. Despite a significant level of research into SM's role in informal learning, there has been limited exploration of its integration into pedagogical practices, particularly regarding assessment challenges and innovations in university settings. Additionally, there is scarce research on mobile applications in academics, hindering the effective integration of SM platforms into curricula. This study addresses these gaps by examining stakeholder perceptions of using SM for educational purposes in a university setting in Qatar. Following a comprehensive and comparative literature review and analysis, a thematic analysis of interviews with 20 stakeholders revealed that SM platforms go beyond communication, serving as tools to enhance professional identity, reputation, research profiles, knowledge dissemination, and social practices, but they lack methodologies to integrate effective learning, either independently or in formal learning/teaching/assessment settings. This study proposes a framework to optimize the use of SM platforms, with a particular focus on sustainability, for lifelong learning and knowledge-based societies leading to more sustainable and prosperous economies. The findings encourage the reconsideration of digital assessment and the expansion pedagogical practices in alignment with modern social learning through an expansive array of SM tools and platforms.

Keywords: social media; online learning; digital education; SDGs; Education 4.0/5.0; knowledge-based society; higher education; university; sustainability

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1. Introduction

The world is becoming undeniably digital to the extent that social media (SM) has become indispensable in daily life. Digital social interactions and Information and Communication Technology (ICT) have revolutionized many aspects of life, changing the way people communicate, learn, teach, work, and share.

Among the sectors impacted by the introduction of technology is education, particularly higher education institutes (HEIs). In this modern digital era, social and technological contexts have become critical aspects of HEIs, aiming to enrich learning methodologies and achieve a vast array of educational outcomes. Smart digital technologies are continually being integrated into higher education, where the implementation of educational technology has become increasingly popular in facilitating learning and improving educational outcomes, thus causing a paradigm shift in traditional education systems. This paradigm

shift prompted a surge in the adoption of SM tools in HEIs, leading to the evolution of pedagogy, formative learning processes, and the overall curricular framework across various programs.

Following the breakthroughs of mechanization and mass production brought about by the discovery of electricity during the classic industrial revolution, we have now entered the age of the fourth industrial revolution, characterized by the advent of AI, smart systems, and unprecedented technological advancements. This revolution has paved the way for a new educational framework known as Education 4.0. Education 4.0 leverages these technological advancements to create a more refined, personalized, and adaptive educational experience. It equips students with the necessary tools to navigate and utilize modern technologies, fostering technological literacy. Building on this, Education 5.0 further enhances the educational framework by incorporating human-centric and sustainable approaches. It emphasizes empathy, ethics, values, and sustainability, aiming to produce graduates who are not only technologically proficient but also socially responsible.

The integration of social media into higher education and the adoption of Education 5.0 are increasingly important due to the rise of digital transformations. As companies and workplaces shift from traditional business processes to digital models, technological proficiency and literacy have become essential. These skills are crucial for participating in an ever-progressing society.

Due to the COVID-19 pandemic, the adoption of SM platforms and emerging technologies has accelerated further, providing both synchronous and asynchronous learning environments to ensure continuous, self-paced, participative learning and teaching. Consequently, the exponential expansion of SM platforms in HEIs has created a collaborative, self-learning, and knowledge-sharing environment, benefiting students' learning [1,2]. SM platforms are now omnipresent in universities, serving as effective mediums for learning, and continuously being adapted to newer technological developments [3].

Prior studies have explored academic perspectives on SM, emphasizing its potential for teaching practices, professional development, collaboration, and promotion of active learning [4–7]. Additionally, existing research investigations demonstrate higher education students' views on SM, highlighting benefits such as enhancing personalized learning, boosting engagement, facilitating knowledge dissemination, and encouraging student learning autonomy [2,3,8,9]. In addition to the aforementioned advantages, the collaborative aspect of SM platforms not only prevents redundant research, but also accelerates the creation of new knowledge, enhancing productivity in academic circles [10].

However, despite the widespread integration of SM into daily life, and the existence of challenges and limitations when it comes to using them in an educational context, there is a scarcity of studies scrutinizing its use for enhancing sustainable education [11], and there is a lack of clear, accepted, and/or widely used methodologies for integrating SM or digital media (DM) tools into HEIs. To this end, this paper seeks to address this gap by investigating the experiences and perspectives of both educators and students towards the sustained learning and diversified pedagogical practices at higher educational levels.

Along with the widespread use of SM platforms, including in HEIs, there has been an emergence of various theories focusing on collaboration and frameworks, suggesting the better enablement of the incorporation of SM within these settings. One of these theories is the Social Cognitive Learning theory (SCLT), developed by Albert Bandura [12]. The theory emphasizes that learning occurs within a social context, where people learn from dynamic and reciprocal interactions with others and are influenced by their surroundings. The SCLT highlights "observational learning", which emphasizes that a new behavior is gained by physical observation, imitation, and modeling others' behavior and actions. The theory states some factors that determine learning behaviors, such as: personal/cognitive factors (knowledge, expectations, attitudes), behavioral (self-efficacy and skills), and environmental influences (social norms) [13]. This theory asserts that self-efficacy plays a pivotal role in regulating learning strategies and human behavior, thereby enhancing proactive learning, self-correction, and academic achievements and expectations. Various models of

self-regulated learning have been developed based on the concept of self-efficacy among learners [14,15].

Due to the continuous growth of digital tools, this theory can be implemented in online learning settings to provide autonomy in learning, and practiced self-regulated learning skills. The integration of SCLT with connectivism, which highlights collaborative learning in the digital age, offers a robust theoretical framework to address the limitation of SCLT in not fully embracing digital technologies or social media as persuasive tools for learning, providing a foundation for embedding social media tools in HEIs and enhancing online learning by investigating motivational factors across behavioral, cognitive, and environmental dimensions [16,17]. Although this framework has been applied in different educational situations and is cited by numerous schools and scholarly papers, one of its main gaps is that it does not encompass more crucial influencing factors such as the influence of SM, emotion, motivation, sense of responsibility, accountability for one's actions, educational level, gender, social identity, religion, and cultural factors to name a few [18,19]. One framework that was suggested to address these factors was the UNESCO sustainable development goals (SDGs).

One of the essential components of the United Nations' SDGs for 2030 is Quality Education. Quality education, which is also referred to as education for sustainability (E*f*S), is the 4th goal, among the 17 SDGs, that aims to "ensure inclusive and equitable quality education and promote lifelong learning", and is considered a main driver for accomplishing the remaining SDGs [20]. Sustainable development calls for social participation and collaboration of individuals at regional, local, and global levels. Merging this framework with the factors related to social–cognitive learning and technology—specifically SM platforms—can play a crucial role in further influencing the lives of people and achieving equitable, healthy, and sustainable societies. In fact, digitalization and the use of emerging technologies, including SM, are envisioned as fundamental tools for achieving all the holistic 17 SDGs [21]. Sustainable online education has, thus, become imperative to ensuring the continuity and improvement of learning. The considerable growth in significance of education for sustainability (E*f*S) has driven educators to understand how sustainability can be integrated within SM applications, positively influencing young adults and contributing to sustainable consumer behavior. Therefore, embedding sustainability concepts, such as environmental responsibility, social engagement, and economic growth, into SM platforms enables students to freely share sustainability principles, raise awareness, practices, attitudes, and environmental responsibility, leading to the progress of societies and communities.

While numerous studies have examined the role of media tools in achieving sustainable development in the Arab world, there is a scarcity of literature focusing specifically on the use of SM tools for sustainability, particularly in Qatar [22]. In light of this gap, this paper aims to explore the potential of emerging SM platforms in HEIs for personalized and informal learning, with a focus on achieving sustainable education and Sustainable Development Goals (SDGs) through their use.

This study introduces the term d-E*f*S (Digital Education for Sustainability), combining the use of SM applications with sustainability education to leverage persuasive tools for continuous learning and behavior change toward sustainability (Figure 1).

Focusing on the domain of d-E*f*S, and referring to the case of Qatar, this present study aims to (1) identify the needs of stakeholders and their perceptions, opportunities, and challenges in using social media for educational purposes, (2) investigate current practices of SM integration within pedagogic strategies, (3) develop suggestions for embracing social media platforms to ensure sustainable learning, and (4) propose a framework based on the findings for improving or developing effective digital learning and assessment methodologies. Based on these aims, the study seeks to address the following questions:



Figure 1. Social media tools as an opportunity to enhance sustainability education through d-E*f*S.

What are the current pedagogical activities, practices, perceptions, and use of SM tools in HEIs?

What are the challenges, drivers, and barriers for digital assessments as part of a properly developed digital learning environment?

Based on empirical data issued from one HEI stakeholders in Qatar, how do we ensure the embedding of sustainability concepts as part and parcel of the digital assessment framework?

This paper is organized as follows: The next section reviews digital learning through digital and social media platforms in university settings, focusing on novel approaches for learning, teaching, and assessment. Section 3 outlines the qualitative methodology used. Section 4 presents the findings from interviews and thematic analysis, compared with the literature review. Section 5 summarizes the findings, answers the research questions, offers recommendations, proposes a framework for digital learning via social media tools in higher education, and discusses the study's limitations and future research directions.

2. Literature Review and Analysis

2.1. Social Media (SM) Integration in HEIs

The continuous growth of SM platforms in HEIs has invited researchers to investigate the role of such integration in sustaining learning, and facilitating social interactions among students and educators through providing an approach for co-construction of knowledge that transcended geographical and temporal boundaries [23–25]. Some have highlighted the distinct characteristics of SM platforms, including browsing information, knowledge sharing, and instant messaging/feedback, which makes SM a favored alternative tool, especially for HEIs that cannot subscribe to Learning Management Systems (LMSs) [26,27]. Another voluminous literature has covered the benefits of embedding SM platforms in HEIs. For example, the literature covers the potential benefits of using SM tools that include, but are not limited to, promoting interactive, collaborative, and student-centered learning [26,28,29], developing a personalized and self-directed learning environment [30], and raising awareness of sustainability [22,31,32].

The integration of SM platforms in HEIs aligns with the broader educational paradigms of Education 4.0 and Education 5.0, which are reshaping the landscape of learning in the context of the Fourth Industrial Revolution. Education 4.0 is characterized by the use of advanced technologies such as artificial intelligence, machine learning, and the Internet of Things to create personalized and adaptive learning environments. This approach enhances student engagement and fosters a more interactive and collaborative learning experience, which is supported by the use of SM tools [33]. Education 5.0 builds on these technological advancements by incorporating human-centric and sustainable approaches, emphasizing the importance of empathy, ethics, and social responsibility in the educational process [34].

The synergy between SM platforms and these educational frameworks is evident as SM facilitates the development of critical soft skills and digital literacy, essential for students to thrive in a rapidly changing digital world [35,36].

Despite these perceived advantages of SM integration, and its alignment with Education 5.0, there is still an ongoing debate around how to better leverage SM for learning in HEI settings, as some scholars declared that these platforms were not initially developed for formal learning [37], even though others argue that learning is not necessarily a dichotomy between formal and informal, rather, learning in formal educational contexts can flow into informal educational activities [25]. This comes in light of the acknowledgment of the adverse impacts of using SM on young adults, such as aggravating physical and mental health problems such eyes strain, stress, anxiety, and depression [38], leading to addictiveness [39], and disrupting effective learning experiences [40–42]. Due to these impacts, educators are ambivalent about the effects of SM tools in teaching–learning contexts, which has resulted in a slow embracing of SM tools in pedagogical practices [43]. For that reason, academic embedding of SM platforms requires careful planning with boundary identification. Moreover, scholars have pinpointed some factors hindering the academic use of SM tools for pedagogical practices, including privacy, cyber security, and, most importantly, the absence of appropriate assessment strategies [44]. This could be due to a lack of training received by educators for using emerging technologies in education [45,46]. Currently, there is a shift in research to understand how to better embed SM platforms to promote student-generated knowledge and a content-sharing environment [9], especially now that SM tools are becoming indispensable in higher education.

For PhD students, SM plays a significant role in developing professional identity, connecting with researchers globally, and disseminating research to enhance publication quality and quantity. Petrovsky (2015) [47] supports the idea that SM tools are indispensable for PhD students, helping them connect with like-minded researchers and collaborate with peers. The effectiveness and challenges of integrating SM platforms have been extensively studied, particularly in health sciences and nursing doctoral education. Al-Dossary et al. [8] emphasized that, with the growth of SM platforms, PhD students in Saudi Arabia, majoring in nursing, have started to use SM platforms, such as LinkedIn and Twitter, for educational and professional development purposes to facilitate the acquisition and dissemination of educational contents, and participate in a dynamic online learning community enabling them to connect with experts in their fields. The authors further stressed that there is a need for assessing the applicability of using SM tools in different educational settings and fields, especially in higher education. Furthermore, Trinova et al. [3], in their scoping review of social media usage by higher educational settings, assured that there are few but increasing studies that explore the use of SM platforms by academics for enhancing teaching activities, since the majority of research studies indicated that academics mainly use SM tools for networking and research purposes. Additionally, studies have pointed out the ethical aspects of published educational contents, and warned about the veracity of the information and the misinformation available on SM platforms [8,48]. To address these issues, researchers have advocated for using SM tools in teaching, providing educational content, and guiding students in identifying reliable information [49].

2.2. Digital Assessment in HEIs Settings

Numerous studies report that the integration of SM tools in education still suffers from many challenges related to the question of assessment [50–53]. In the same vein, it becomes imperative to rethink educational assessments in this digital era with an emphasis of alignment with learning objectives and curriculum priorities. To measure the extent of success of any learning technique, it is suggested that robust assessment should be the main factor that dictates the learning outcomes. Online assessments come into various alternative assessment modes—unlike traditional types of assessment—and aim to assess students' learning and improve their understanding. Undeniably, effective teaching requires the use of good assessment strategies.

Scholars propose that assessments should be designed in parallel with students' needs to meet the demands of 21st century skills, while considering technology-based assessments rather than traditional ones [54]. The 21st century assessment moves beyond the fundamentals of basic learning (reading, writing, interpreting, memorizing facts) to master life-long learning skills such as cognitive skills (problem solving and critical thinking), communication skills, and technological savvy [55]. Bodies of literature have addressed the significance of practicing sustainable online formative assessments for providing timely, meaningful feedback to support students' learning and divergent thinking skills [53,56,57]. Thus, the 21st century assessment framework provides a wide variety of options where it allows students to choose the preferable technique of learning that best showcases their skills of how to use their knowledge.

The swift implementation of online assessments in higher education institutions (HEIs) presents promising prospects for the digitization of education, enabling the evaluation of traditional student competencies through innovative technological means. However, this transition introduces challenges for HEIs, encompassing issues of usability, validity, security, and the reliability of assessments conducted through digital platforms [58,59]. A considerable body of scholarly work has scrutinized the characteristics, processes, frameworks, and methodologies of digital competence assessments in higher education, addressing challenges related to the reliability and validity of these online assessments [58,60–64]. Research findings underscore the importance of maintaining assessment consistency and difficulty levels to evaluate reliability, employing measures such as Cronbach's alpha for internal consistency, which gauges the extent to which assessments consistently measure learning outcomes as intended [65]. Ensuring assessment validity involves scrutinizing whether the assessment measures the intended concept (construct validity), accurately represents its intended content (content validity), aligns with its purpose (face validity), and effectively measures the intended outcomes (criterion validity) [66]. To align digital assessments with learning objectives, the selection of an appropriate digital tool is crucial for usability in assessing students' learning within a subject. Assessment reliability is achieved when students consistently achieve the same results on different occasions or times, while validity is concerned with whether the assessment measures its intended targets. It is notable that an assessment can be reliable without necessarily being valid. This nuanced understanding is crucial for ensuring the effectiveness and alignment of digital assessments with their intended educational objectives.

2.3. Learning through SM: Example on Digital Education for Sustainability (d-EfS)

Despite limited research on the integration of SM platforms in sustainability education in HEIs [31,67], these tools are increasingly recognized for their potential to enhance sustainability knowledge, awareness, and foster sustainable attitudes and behaviors among the younger generation [32,67,68]. Sustainability practitioners acknowledge SM's effectiveness in disseminating knowledge and expediting actions, although community-building efforts remain infrequent [31]. Given learners' immersion in digital culture, SM platforms usage in educational institutions is deemed essential, aligning with the global implementation of SDGs to engage a wider audience [69].

HEIs have incorporated SDGs into their systems and curricula, utilizing social networks for knowledge dissemination and community awareness [70,71]. SM platforms, exemplified by WhatsApp, have been instrumental in assessing learners' perception and awareness of environmental issues, demonstrating their vitality in discussing problems, enhancing responsibility, and proposing solutions to achieve SDGs [69]. Recommendations include integrating DSM platforms into syllabi and curricula to meet the dynamic learning landscape's demands [72].

The proliferation of social media tools like Facebook, Twitter, and Instagram, holds great potential for sharing sustainability information and fostering awareness and behavioral change [73]. Notably, Facebook facilitates the creation of online groups to address sustainability issues, Twitter enables real-time communication to inspire behavioral changes,

and Instagram, increasingly used by universities, showcases sustainability campaigns to influence greener behaviors [74]. Libraries also leverage social media to disseminate sustainability information and engage users [74]. Nonetheless, the intersection of sustainability and SM remains underexplored, necessitating further research to understand its integration in education [75,76]. Similarly, more studies are needed to examine how social media activities can raise awareness and promote sustainable lifestyles [22,32,74–76].

2.4. Comparative Analysis of Integrating SM in HEIs in the GCC Countries

In the realm of the ongoing digital revolution, the Gulf Co-operation Council (GCC) countries have witnessed profound societal transformations and technological integrations, notably within higher education institutions (HEIs). The extensive adoption of SM platforms across these nations has not only influenced societal identity but has also presented challenges and opportunities across various domains.

SM platforms have reshaped societal identity and brought changes in lifestyle, business, education, and work patterns in the GCC [77]. The younger generations in the GCC are among the highest SM users globally, utilizing these platforms for communication, marketing, social identity development, learning, and knowledge dissemination [78]. This extensive SM adoption has prompted GCC countries to develop digital transformation strategies across sectors, with HEIs playing a central role in this shift. This led the GCC countries, most notably Qatar, Saudi Arabia, and the UAE to experience notable changes in their educational landscapes.

Within the context of sustainability, HEIs in the GCC, especially in Qatar, are crucial for transitioning to knowledge-based economies driven by ICT, innovation, and sustainability goals [79]. HEIs incorporate sustainability concepts into curricula, infrastructure, and strategic partnerships [80]. Each GCC country aligns its higher education sector with national visions and goals. Qatar's National Vision 2030 focuses on education, innovation, and human capital development [81]. Saudi Arabia's Vision 2030 emphasizes digital transformation in higher education to diversify the economy [82]. The UAE's Abu Dhabi Economic Vision 2030 aims to create a sustainable knowledge-based economy with technology-based education [83].

SM platform integration for educational purposes is evident across the GCC. Qatar's HEIs leverage SM networks for new learning experiences and lifelong learning [22]. In Saudi Arabia, HEIs use platforms like Twitter, LinkedIn, and YouTube for collaboration and knowledge sharing [18,84]. The UAE employs platforms such as YouTube, Facebook, Instagram, and Twitter to enhance collaborative learning [85,86].

While the integration of SM platforms in education brings numerous benefits, challenges also arise, such as distractions affecting academic performance [87]. Therefore, there is a need for clear strategies and frameworks to effectively embed SM platforms for educational purposes and enhance active collaborative learning in HEIs [18,88]. This paper aims to address this gap in the literature by investigating the proper integration of SM platforms across the GCC, looking primarily at the case of the State of Qatar, for educational purposes.

3. Materials and Methods

Exploratory research is an inductive method of research used to investigate new, underexplored topics and research questions, aiming to identify general principles based on observations [89]. This study employs the case-study approach, a type of exploratory research, to provide an in-depth understanding of local issues and concerns, particularly in social sciences and education. This exploratory case study has two main objectives. First, it investigates current pedagogical practices and stakeholders' (students and faculty) perceptions of SM integration for academic purposes at a specific HEI in Qatar. Second, it aims to propose a tailored framework for social media integration that adheres to the local and cultural context. Using semi-structured interviews and purposeful sampling, the study explores stakeholders' needs, opportunities, and challenges related to integrating social me-

dia platforms into digital assessments, curricula, and educational activities. The collected data were then analyzed and meaningful themes were generated using Atlas.ti [90]. This qualitative analysis is intended to obtain an in-depth understanding of the current needs, perceptions, and pedagogical practices and suggestions for better SM integration to maximize the potential benefits of these tools. Semi-structured interviews were employed to reflect the objectives of this research, while exploratory research was conducted to address the opportunities and challenges, and propose a framework to encourage the use of these tools into curricula. The methodology used to conduct the study is depicted in Figure 2 as shown below.

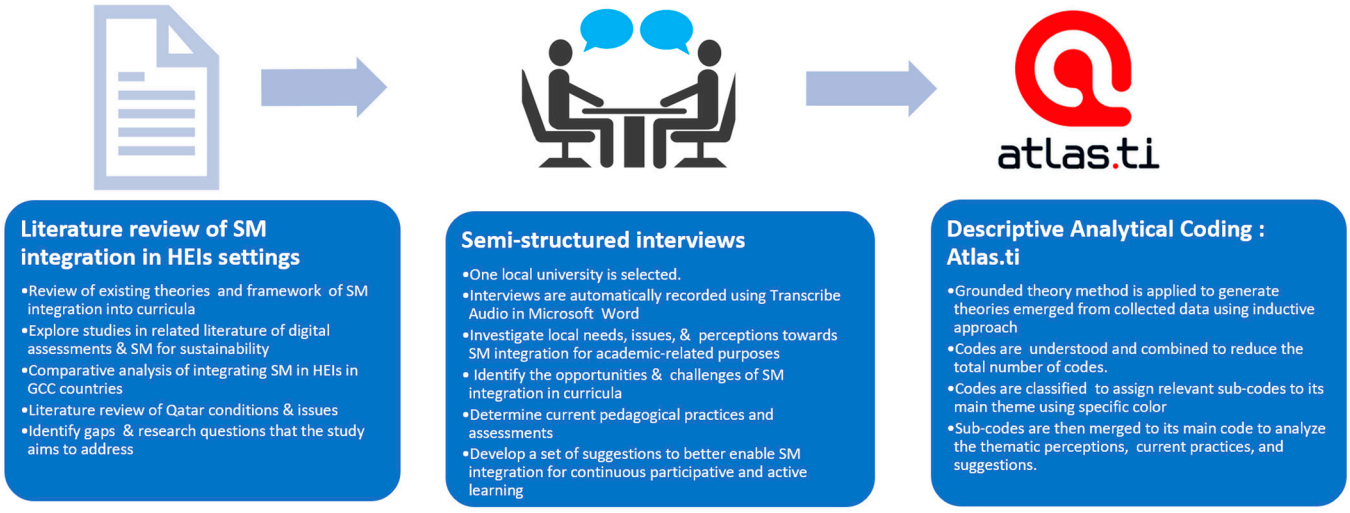

Figure 2. Research Methodology Approach.

This study conducted an extensive literature review using the following databases: ERIC, ScienceDirect, and Frontiers, focusing on keywords related to social media in learning, higher education, sustainability, sustainable learning, online collaborative learning, online assessments and Education 4.0/5.0. The research is confined to a local university in Qatar with approval from the Institutional Review Board (IRB). Stakeholders were approached through email, and consent was obtained to ensure participant confidentiality. Semi-structured interviews were chosen for their flexibility and interactive nature, allowing for in-depth exploration of the role of SM in HEIs [91]. The interviews, conducted between 14 May 2023, and 9 July 2023, involved 20 stakeholders (11 faculty members, 8 students, and 1 instructional design specialist), and their preferences for face-to-face or online interviews were accommodated. Demographic characteristics of participants are detailed in Table 1 and Figure 3, with identity protection ensured through coded naming (P1 to P11 for faculty, S1 to S8 for students, and T1 for the instructional design specialist).

The research procedure was meticulously planned to ensure a comprehensive data collection process. Initially, each interview was audio-recorded using both the Microsoft Word "Dictate" feature and a manual recording device operated by a co-author. This process began with recording the audio, followed by using the transcribe function in Microsoft Word to create initial transcripts. These transcripts were then compared with the manual recordings to ensure accuracy.

Each interview's transcript was saved as a separate document to maintain organization and ease of access. The next step involved manual coding of the transcripts, where the most frequently mentioned themes were identified. This manual coding process was crucial for capturing the nuances of the participants' responses.

Table 1. Participants' demographic characteristics.

Code	Gender	Nationality	College/Department	Role
P1	Male	non-Qatari	Humanities and social sciences	Professor
P2	Male	Qatari	Science and engineering	Professor
P3	Female	non-Qatari	Humanities and social sciences	Professor
P4	Female	non-Qatari	Public Policy	Associate Professor
P5	Male	non-Qatari	Science and engineering	Professor
P6	Male	non-Qatari	Humanities and social sciences	Associate Professor
P7	Male	non-Qatari	Health and Life Sciences	Professor
P8	Male	non-Qatari	Liberal Arts and Sciences	Senior Associate Dean
P9	Male	non-Qatari	Humanities and social sciences	Professor
P10	Male	non-Qatari	Science and engineering	Associate professor
P11	Female	non-Qatari	Science and engineering	Professor
T1	Female	non-Qatari	President Office	Instructional Design Specialist
S1	Male	non-Qatari	Science and engineering	PhD student
S2	Male	non-Qatari	Science and engineering	PhD Student
S3	Male	non-Qatari	Science and engineering	PhD Student
S4	Male	non-Qatari	Science and engineering	PhD Student
S5	Male	non-Qatari	Science and engineering	PhD Student
S6	Male	non-Qatari	Science and engineering	Master's Student
S7	Male	Qatari	Humanities and social sciences	PhD Student
S8	Female	Qatari	Public policy	Bachelor Student

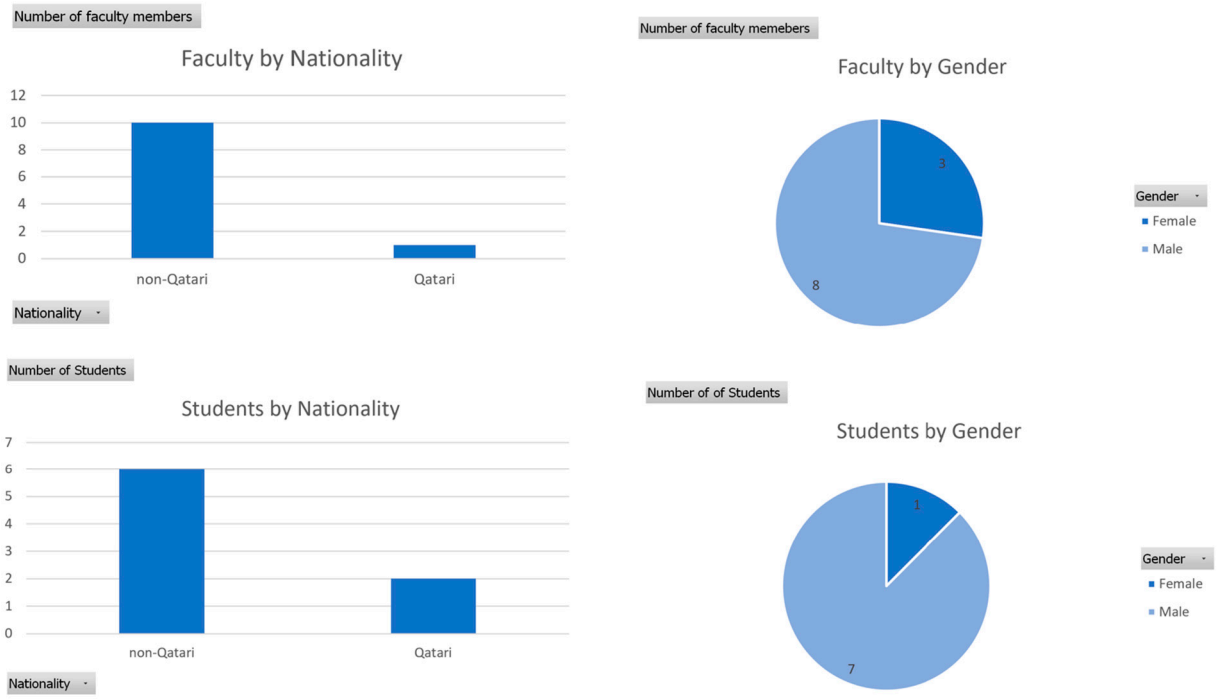

Figure 3. Participants' demographic characteristics.

To further enhance the validity and reliability of the collected data, additional measures were implemented. The use of phone "memo" recordings provided an extra layer of verification, ensuring that the automatic transcriptions were accurate and consistent. This redundancy minimized the risk of data loss and transcription errors. Furthermore, the manually coded themes were cross-checked and validated through Atlas.ti 24, a qualitative

data analysis software, which allowed for a systematic visualization and organization of themes and sub-themes. By employing specific colors for different themes, we ensured clear differentiation and accurate representation of the data. Additionally, two co-authors double-checked the work at each stage of the process, ensuring consistency and accuracy. These combined efforts, including cross-verification, redundancy, systematic analysis, and collaborative double-checking, reinforced the integrity of the data, thereby strengthening the study's overall findings.

Qualitative data from the semi-structured interviews were interpreted and coded using Atlas.ti, identifying themes, patterns, and relationships among the data. Coded data and findings were also visually analyzed to build grounded theories with respect to stakeholders' perceptions. The grounded theory method was thus applied using descriptive analytical coding techniques through open, axial, and selective coding to better understand, analyze, and describe the coded text or quotations and connect them to specific themes [92]. Both codes and sub-codes were generated inductively from the data and further analyzed under the main themes of perceptions, current practices, and suggestions toward the use of SM platforms for educational purposes. Overall, the main codes and sub-codes used are the following: (1) SM challenges—Faculty, (2) SM challenges—Students, (3) SM opportunities—Faculty, (4) SM opportunities—Students, (5) Faculty Preferences, (6) Students Preferences, (7) SM usage before and after pandemic, (8) Existing solutions, (9) Suggestions, and (10) Learning in context of Qatar. Figure 4 provides a screenshot of the generated themes where the term "Grounded" refers to the frequency of the code that has been applied and "Density" is the link between the themes and main codes.

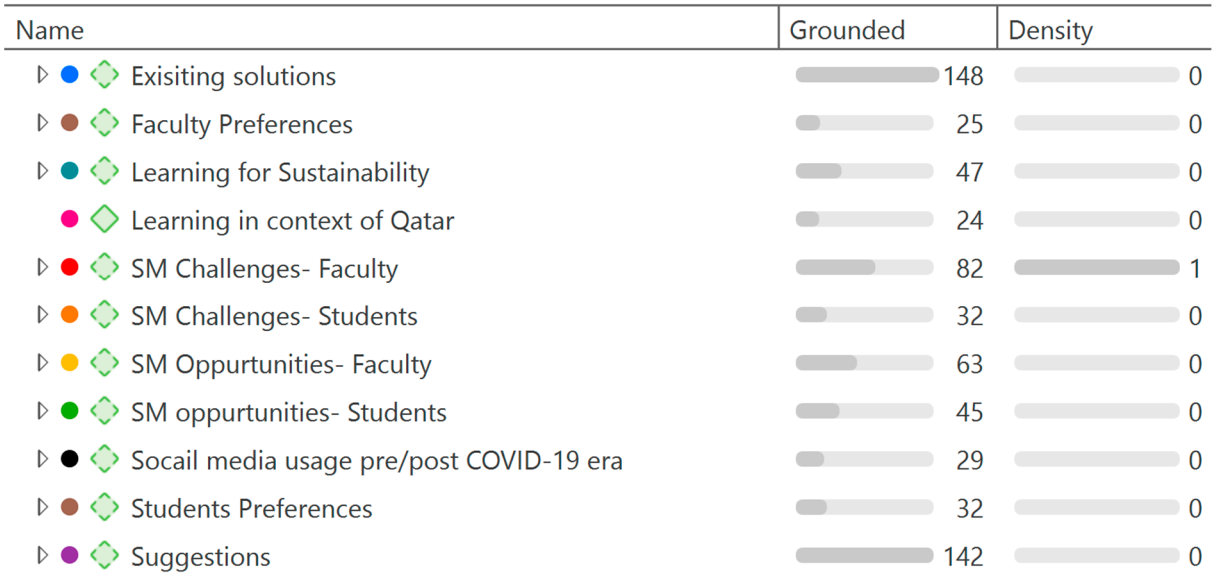

Figure 4. Screenshot of code groups in Atlas.ti.

4. Results and Discussions

This section unveils faculty and student perspectives on integrating SM tools into HEIs by analyzing the collected data. Moreover, this section also goes through suggestions for improving SM integration in HEIs, specifically focusing on refining assessing, teaching, and learning practices.

4.1. Faculty and Students' Perceptions and Preferences

The main challenges prevalent to most faculty and students in terms of SM integration within HEIs were investigated using the following Sankey graphs in Figures 5 and 6, respectively, to highlight these occurrences. Table 2 is the code co-occurrence table of coded instances based on which the graph above was developed. From Table 2, it is clear that cultural barrier (17 quotes), ethical concerns (10 quotes), and a lack of human

interactions (8 quotes) were the most perceived challenges according to the interviewed faculty. Other repeated themes that were declared by these faculty are distractions, students' demotivation, incompatibility with subject, and digital assessment issues when using SM platforms.

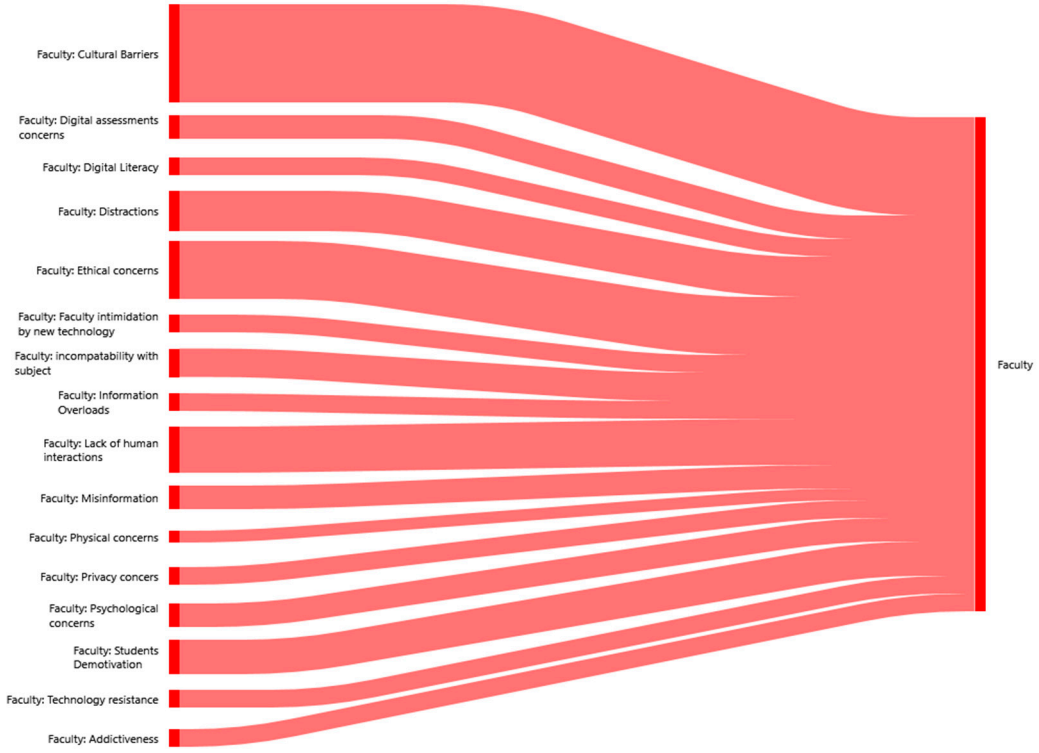

Figure 5. Sankey chart depicting faculty challenges to using SM platforms for educational purposes.

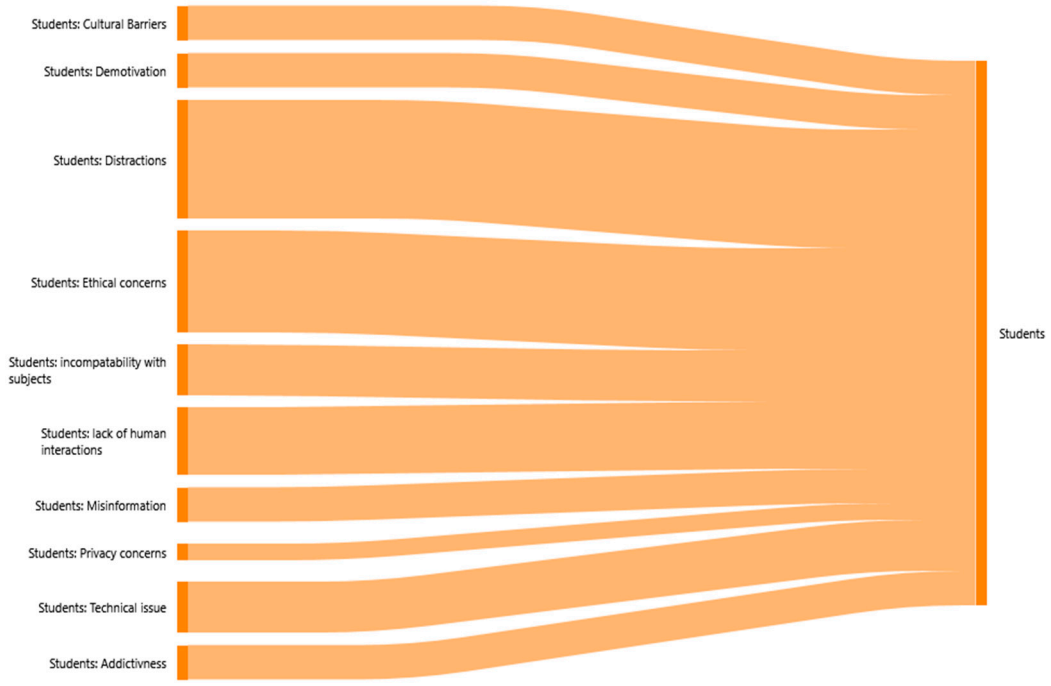

Figure 6. Sankey chart depicting students' challenges to using SM platforms for educational purposes.

Table 2. Code co-occurrence table used to highlight main challenges for faculty and students.

Perceived Challenges	●Faculty Perceptions	●Students' Perceptions
Cultural Barrier	17	2
Ethical Concerns	10	6
Lack of human interactions	8	4
Distractions	7	7
Students Demotivation	6	2
Incompatibility with subject	5	3
Digital Assessment concerns	4	-
Psychological concerns	4	-
Misinformation	4	2
Digital Literacy	3	-
Information Overloads	3	-
Intimidation by new technology	3	-
Privacy concerns	3	1
Physical Concerns	2	-
Addictiveness	2	2
Technology resistance	2	-
Technical Issues	1	3
Time Constraints	4	-

To streamline subcodes, relevant ones have been merged under their respective overarching themes.

For example, "Gender difference" has been consolidated under "cultural barrier", "lack of trust" and "uncertainty of attentiveness" under "Ethical concerns", "Lack of eye contact" and "Lack of body language under "Lack of human interactions", etc.

Among students, frequently perceived challenges include distractions (7 quotes), ethical concerns (6 quotes), and lack of human interaction (4 quotes). To enhance clarity, some subcodes have been consolidated based on their thematic connections. For instance, "Lack of trust" is also integrated under the subcode of "Ethical concerns."

On the other hand, there are challenges that were mentioned by faculty but not students. Among these challenges are digital assessment concerns, psychological concerns, feeling intimidated by technology, technology resistance, time constraints, and Information overloads as illustrated in Figure 5.

These findings were found to be aligned with those of previous studies, such as the one conducted by Hujran [93], which elucidated Saudi's conservative culture with respect to religious values as representing the main barrier for a full SM integration. Additionally, with respect to ethical concerns, there is a growing unease in the literature indicating that the use of SM could lead to academic fraud and violations of academic integrity through sharing unauthorized resources and plagiarism [94–97]. For instance, Hokke et al. (2020) [95] in their study found that educators were unaware of the ethical appropriateness of using SM platforms in HEIs settings, and hence HEIs should provide SM-based research ethics training, and disseminate professional SM ethical guidelines to reduce these ethical concerns and academic transgressions. Another recurrent challenge from this study is the lack of human interaction which is also aligned with the findings stated by Al-Mawee [98], where results emphasized that digital learning diminish human interaction among students and educators due to the absence of physical co-presence. Distraction is another additional theme, which is also present in previous findings [87].

On the theme of SM integration opportunities, findings from both participating faculty and students are visualized in the Sankey graph in Figures 7 and 8, respectively. Table 3 represents the code co-occurrence table of coded instances based on displayed figures of 7 and 8 accordingly. From the Table 3, it is clear that knowledge dissemination (14 quotes), sustain learning (13 quotes), and promote discussion (11 quotes) were the most perceived opportunities according to the interviewed faculty. Other recurrent themes that were stated by these faculty members are conveniences and flexibility, real-world applications, keeping

up to date, and instant communication. To reduce the number of subcodes, "User-friendly tools" was merged with the "Conveniences and flexibility" subcode. As for students, conveniences and flexibility (10 quotes), knowledge dissemination (7 quotes), and sustain learning (7 quotes) were the most mentioned perceived opportunities by interviewed students. From these findings, it is noticeable that there were some opportunities stated by faculty but not students. Among these opportunities are complementary tools for teaching and student-centered learning. From their end, students stressed different opportunities, mainly entertainment. These findings align with existing research, indicating that both students and faculty increasingly utilize social networks for knowledge dissemination [9,99]. Moreover, the literature suggests that open-accessible resources on SM platforms aid in sustaining education, particularly during emergency learning situations [30,50,100,101]. Additionally, a wealth of literature highlights the role of SM platforms in promoting discussions, enhancing engagement, and fostering collaborations [2,3,8,9].

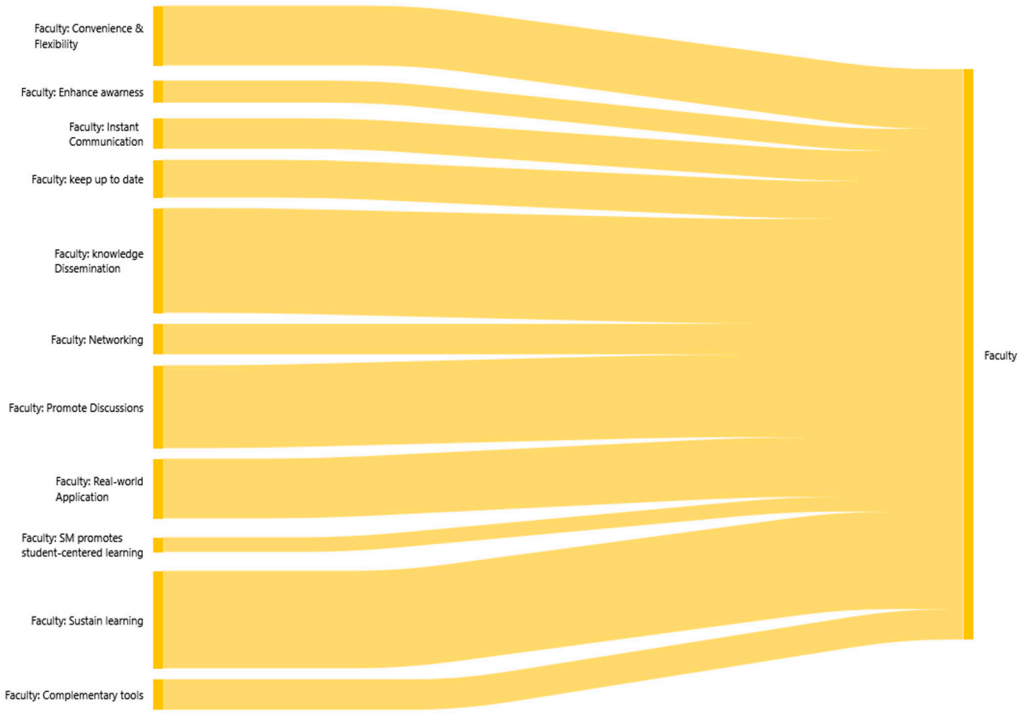

Figure 7. Sankey chart depicting faculty opportunities for using SM platforms for educational purposes.

Table 3. Code co-occurrence table used to highlight main opportunities for faculty and students.

Perceived Opportunities	●Faculty Perceptions	●Students' Perceptions
Knowledge Disseminations	14	7
Sustain learning	13	7
Promote Discussions	11	4
Conveniences and flexibility	8	10
Real-world applications	8	2
Keep up to date	5	5
Instant Communication	4	3
Networking	4	6
Complementary tools	4	-
Enhance awareness	3	3
Student-centered learning	2	-
Entertainment	-	2

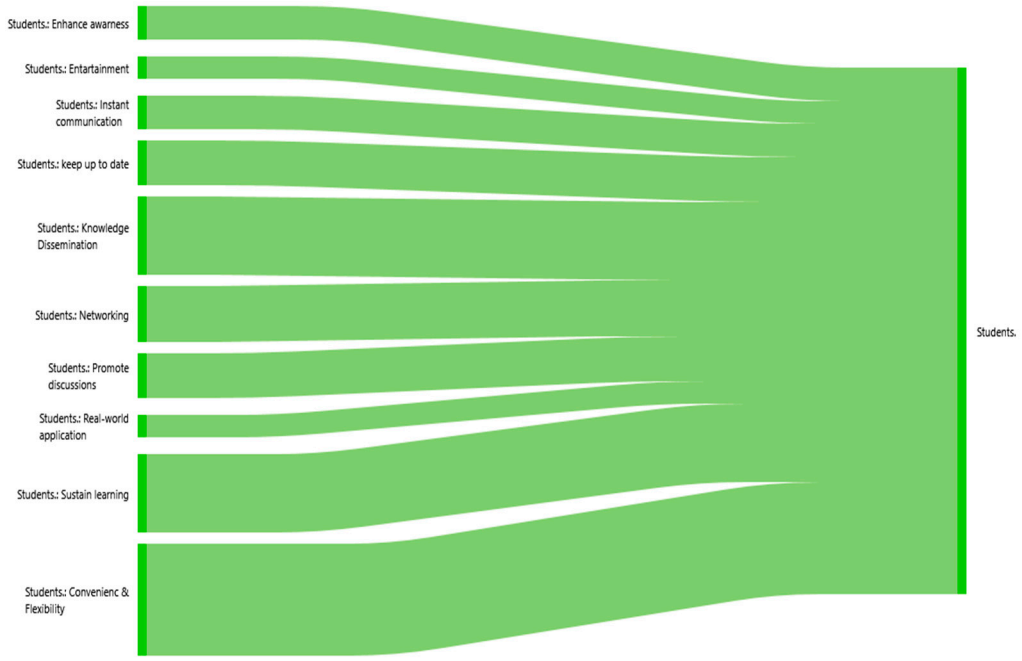

Figure 8. Sankey chart depicting students' opportunities for using SM platforms for educational purposes.

Overall, these results showcase the dual nature of SM integration in HEIs reflecting both its potential and challenges as highlighted in existing literature. On the positive side, participants think that SM platforms enhance professional identity, knowledge dissemination, and foster interactive learning environments, aligning with the findings of Bond et al. (2020) [36] and Selwyn (2016) [35]. They also support personalized and adaptive learning, and promote lifelong learning, as emphasized by Hussin (2018) [33]. Additionally, our results agree with Ahmad et al.'s (2022) [16] work by emphasizing the importance of SM in incorporating human-centric and sustainable approaches, highlighting discussion, ethics, and sustainability in Education 5.0. However, the study also identifies significant drawbacks, such as the lack of human interaction, cultural barriers, and ethical concerns including misinformation, echoing concerns raised by Al-Mawee (2022) [98], Hujran et al. (2021) [93], and Best and Shelley (2018) [94]. These findings highlight the necessity for a balanced approach in leveraging SM in educational contexts, ensuring benefits are maximized while mitigating potential negative impacts.

Regarding the method of teaching, faculty preferences lean towards hybrid teaching, with 80% valuing its flexibility, participation, engagement, and skill development. However, over half still favor face-to-face instruction for its smaller class sizes and irreplaceable traditional methods, emphasizing nuanced human interactions. This preference aligns with a broader trend revealed by a study showing a collective favoring of traditional and blended learning over remote methods post-pandemic [102].

Most faculty prefer formative assessments, citing the limitations of traditional summative exams due to their lack of quality feedback and focus on factual recall. One faculty member (P8) suggests a balance between formative and summative assessments to provide a comprehensive view of student performance, in line with literature advocating for a mixed assessment approach (Fuad, 2020) [103]. Some faculty (P3, P6, P9) also value stronger student-faculty relationships for motivation, emphasizing the importance of proximity and multi-directional learning, consistent with [104] on the impact of relationships in online learning environments.

Students predominantly favor ongoing formative assessments over traditional exams, valuing presentations, discussions, reflections, portfolios, projects, review papers, and quizzes. Only one student (S4) prefers paper-based assessments to avoid technical issues.

Students also appreciate group work for idea exchange and exploring topics from different perspectives.

Regarding learning styles, the majority of students express a preference for visualizing digital learning content over traditional textbooks, citing improved comprehension and cognitive thinking skills. P5 mentions using augmented mixed reality tools to visualize complex concepts. This preference for visual learning is supported by Mendez-Lopez et al. [102], whose research on psychology students at the university level indicates that 3D visualization techniques enhance knowledge acquisition and satisfaction.

Half of the students (S1, S2, S7, S8) express a preference for synchronous learning, citing benefits such as enhanced self-efficacy and improved communication. S8 notes that online learning reduced shyness. The other half (S3, S4, S5, S6) favors asynchronous learning for its affordability and flexibility. Additionally, students (S1, S2, S7, S8) view hybrid learning as the most effective, striking a balance between face-to-face and digital methods. Examining faculty and student perceptions of SM integration, a prevalent negative sentiment is observed. Table 4 summarizes code co-occurrence, revealing 57% of faculty with negative perceptions and 43% in favor. Among students, 58% favor using SM platforms as open learning resources, while 42% have negative perceptions, which conforms with Al-Hail et al. [50] study, indicating a global trend where students tend to favor SM platform use more than faculty, often due to challenges in integrating them into teaching practices and curricula.

Table 4. Code co-occurrence table on perceptions on using SM among faculty and students.

	Faculty Perceptions	**Students' Perceptions**
Negative/Challenges 114	82	32
Positive/Opportunities 108	63	45

4.2. Existing Solutions on Integrating SM Tools into HEIs Educational Settings

4.2.1. Faculty Pedagogical Practices and Approach towards Integrating SM Tools

In this section, the interviewed faculty expound upon the integration of SM tools into pedagogical practices. They discern the evolving role of SM platforms in their respective universities, citing their impact on educational assessments, pedagogy, and extracurricular activities.

Instructional design specialist T1 highlights the widespread use of academic social networks like LinkedIn, ResearchGate, Google Scholar and Google docs in education. T1 notes their historical role in promoting professional activity among students and faculty, with ResearchGate being particularly popular for creating profiles, sharing work, tracking citations, and fostering collaboration. LinkedIn, recommended to students, serves multifaceted purposes, such as extending publications, increasing citations, and engaging in professional development. P2 affirms the platform's significance, stating, "I use LinkedIn to publish my papers. . . I encourage students who seek jobs to add their skills and showcase their work" (P2). This reflects LinkedIn's growing role in employability and networking. Google Docs is leveraged for interactive lectures, allowing real-time student participation and assessment. Google Scholar is advocated for students as a credible resource in assignments. These findings echo the broader literature, where these tools have become integral components of digital academic landscapes [104–108].

Non-academic social networks like WhatsApp and YouTube are widely used for instant communication and visualizing theoretical concepts. WhatsApp is popular for effective communication, content sharing, and collaboration. YouTube is recommended for its visual learning benefits, supported by research on the positive impact of multimedia on learning [109]. Twitter, Instagram, and TikTok are used for sharing insights, discussing topics, and simplifying complex concepts. Twitter actively engages students, Instagram

sustains learning motivation, and TikTok, though still new, shows potential for educational content. These observations align with studies highlighting Twitter's positive impact on learning and Instagram's emerging role in education [110].

Regarding sustainability education, faculty underscore the pivotal role of SM in disseminating sustainability knowledge, raising awareness, and fostering community engagement. Sustainability concepts are recognized as being more prominently learned from SM platforms than from formal curricula. P5 emphasizes the influential power of SM, stating, "Social media can have the power to shape the sustainability mindset and any mindset! Good and bad" (P5). These sentiments align with previous studies highlighting the potential of SM platforms in promoting sustainability practices [32,67–69].

In terms of integrating sustainability concepts into curricula, faculty reveal that this is often contingent on the relevance of the course to sustainability. However, the broader literature underscores the nascent stage of sustainability integration into formal curricula, with alignment challenges and an absence of dedicated courses [22,80,111,112].

Some faculty contend that students learn more about sustainability from SM platforms than from formal education. However, efforts are underway to revise curricula and incorporate sustainability concepts, especially in specialized fields. P9, specializing in Islamic finance, notes, "We revised our curricula to incorporate more concepts of sustainability" (P9). These observations align with broader studies highlighting the need for sustained efforts to integrate sustainability education into formal curricula [68].

Moreover, faculty recognize the crucial role of social networks in sustainability and Qatar National Vision 2030 (QNV2030). P4 asserts, "Digital transformation is the core of QNV2030. So digital education is receiving more attention since the pandemic as it sustains learning successfully, particularly these open platforms of social media that are free and accessible" (P4). SM platforms are seen as conduits for developing sustainability competencies, ensuring continuity of learning under diverse circumstances. Figure 9 below provides an overview of D-E*f*S) learning in the context of Qatar.

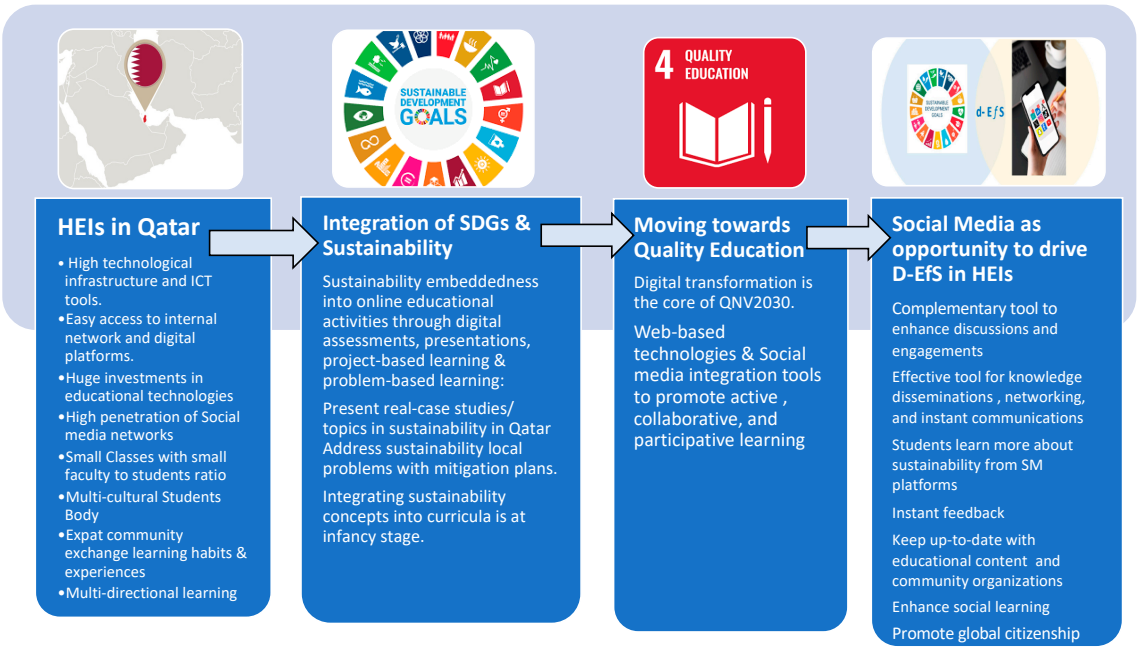

Figure 9. Overview of d-E*f*S learning in context of Qatar based on findings.

4.2.2. Students Learning Approach through Adoption of SM Tools

All interviewed students affirm that the global COVID-19 pandemic has served as a catalyst, motivating and accelerating the adoption of SM platforms. This widespread adoption aims to ensure the continuity of the learning and teaching process during disruptions. This trend aligns seamlessly with the literature discussed earlier, highlighting the surge

in popularity of various SM platforms for academic communication and the provision of accessible educational resources during the pandemic [30,101,109,110].

The embrace of digital technologies during the crisis has transformed students into more self-regulated learners. Specifically, S3 underscores this shift, stating, "I stopped relying on professors and try to figure out on my own, I now have more sense of responsibility to look for references and online resources which improved my self-regulated learning skills." This resonates with existing studies, indicating that the global pandemic prompted students to adapt to changes in learning methods, fostering the development of self-regulated learning competencies [113,114]. Students now approach learning tasks autonomously, with efficacy, self-confidence, and a reliance on online resources.

As a result of these changes, students exhibit an enhanced ability to discern the reliability and suitability of online platforms for assessments and research. For instance, S2 articulates, "I learn through YouTube if I want to get background on some topic for basic learning, but if I want to learn about a complex topic, I go to ResearchGate and check for academic papers." This awareness underscores students' ability to evaluate the credibility of SM platforms for various educational tasks.

Most students report using social media tools for educational purposes due to their perceived benefits. Among academic platforms, ResearchGate stands out. Students use it to create profiles, read papers, showcase publications and much more. This aligns with research showing that doctoral students use ResearchGate to showcase academic activities and maintain scholarly communications [105].

Furthermore, LinkedIn finds utility among students (S1, S2, and S3) for personal branding, job opportunities, and professional networking. For example, S1 elucidates, "I used LinkedIn to share my publications and stay up-to-date with the research and connect with some experts in the field of interest." This aligns with literature highlighting students' use of LinkedIn as a career development tool to develop their professional profile [115,116].

While only two students (S1 and S4) explicitly highlight the benefits of Academia.edu for sharing publications and scholarly communication and networking, Thelwall and Kousha's [117] study underscores the platform's significant role in scholarly communication among graduate students and postdoctoral researchers. Figure 10 summarizes the academic social networks currently utilized by students to facilitate learning.



Figure 10. Academic social networks that facilitate social learning infrastructure for faculty and students.

In the realm of non-academic pursuits, YouTube emerges as a universally utilized platform among the interviewed students. They leverage YouTube to watch educational videos pertinent to their courses, considering it a supportive educational platform. For example, S7 attests, "I always use YouTube to watch videos relevant to the course topic for further clarifications and better understanding." This aligns with a study by Černá and Borkovcová [118], reporting that higher education students express motivation and satisfaction in using YouTube as a study tool. The platform's accessibility and availability of relevant topics contribute to improved learning outcomes.

Similarly, Instagram stands out as the most frequently used tool among students, serving as a motivating force that extends learning beyond the lecture hall, seamlessly integrating into their daily lives. Some students emphasize the presence of sponsored and useful posts on Instagram, appearing in their explore page. Obeso [119], Reyna [120], and Richter et al. [7] note Instagram's exceptional popularity among adults, enhancing their learning outcomes, and attributing it to its interactive and sociable features. This resonates with Erarslan's [121] research, revealing that university students perceive Instagram as a frequently used tool for educational purposes, positively impacting their learning outcomes and providing authentic learning opportunities.

WhatsApp finds favor among the majority of students (S1, S2, S3, S4, S6, and S7) for instant communication, document sharing, asking questions, receiving responses, and collaborating on specific tasks through WhatsApp groups. S6 mentions, "WhatsApp Group is used to share questions or concerns as colleagues respond faster there instead of emails." Research by Bouhnik and Deshen [122], Jafar et al. [109], C. E. (Catherine) Lee et al. [123], and Sayan [124] underscores WhatsApp's potential as a powerful collaborative educational tool.

X, formerly Twitter, functions as a platform where students (S1, S2, S7, and S8) can exchange their perspectives on specific subjects, fostering communication, writing, and critical thinking abilities through interactions with other users. S8 mentions using Twitter to engage in discussions and share opinions, stating that it enhances their critical thinking, particularly when faced with opposing views from followers. This observation supports Malik et al.'s [125] research, highlighting Twitter's effectiveness as a pedagogical tool for sharing insights and reflecting on thoughts. While only one student emphasizes the use of a Facebook Group for enhancing participative and collaborative learning, indicating that students in Qatar rarely use Facebook for formal or informal learning, another student highlights the use of Snapchat for promoting digital citizenship.

Regarding sustainability knowledge and attitudes, half of the students (S1, S3, S7, S8) express learning sustainability principles from rich social media content and posts. S1 mentions, "I learn about sustainability concepts from social media platforms, like from Instagram accounts: DeapQatar and Greener.qa, that show sustainability practices." This contradicts earlier literature [32,68,76], which suggested that sustainability content is rarely found on social media platforms. However, further empirical studies are needed, particularly focusing on the availability of sustainability content in social media platforms in Qatar.

In contrast, a few students (P2 and S8) indicate learning sustainability principles from university courses. S2, for example, mentions, "My college offers me a core course named Fundamentals of Sustainability that enriches me with sustainability principles." Additionally, one student emphasizes their eagerness to learn about sustainability, opting for sustainability courses as electives. S8 adds, "I have also taken an elective course for sustainability named Sustainability: Energy, Environment and Economics, but, in general, I learn more about sustainability practices on social media platforms than in curricula." Figure 11 summarizes the non-academic social media platforms used by both faculty and students to promote a collaborative learning environment.



Figure 11. Non-academic social networks that facilitate social learning infrastructure for faculty and students.

4.2.3. Current Assessments and Pedagogical Approaches to Learning

The faculty employs various assessment approaches to gauge students' comprehension, meet course expectations, and achieve learning outcomes. They integrate digital technologies into pedagogical practices, promoting collaborative learning and teamwork in assessments (P8). This aligns with the trend in literature emphasizing the pedagogic shift towards ubiquitous educational technology, particularly SM platforms [28,126,127].

In this regard, participants P3 and P4 highlight the use of revised blooms taxonomy to assess students with descriptions of elements that help them to move to higher level of thinking. The emphasis on fostering collaboration, social skills, and creativity not only assesses students but also promotes higher-order thinking, in line with the literature on connectivism enhancing engagement in online learning [128–130].

The majority of faculty maintain a balance between summative and formative assessments, as seen with P2, P5, P7, and P10. This approach, as emphasized in the literature [103], underscores the importance of varied assessment types in ensuring student understanding and progress monitoring. Additionally, the incorporation of digital peer assessments by faculty like P6, P9, and P11 reflects a commitment to enhancing self-efficacy and student-centered learning, aligning with Makina's [131] perspective on the benefits of fostering student confidence and ownership. This approach, supported by [132], not only enhances self-efficacy but also serves as an engaging tool for student-centered learning.

In a different vein, P10 underscores the significance of self-assessment, echoing Ifenthaler et al. [133] findings on its prevalence in online learning. The theme of empowering students through self-evaluation persists, drawing a parallel between faculty insights and established research. Moreover, faculty members diversify their assessment strategies by incorporating real-life applications supported by multimedia, as exemplified by P5. This aligns with the evolving post-pandemic trend observed in literature, where faculty increasingly leverage various online assessment strategies, such as quizzes, case studies, blogs, and Peer-Tutorial videos [52].

However, less than half of the interviewed faculty members (P2, P4, P9, P10) are fully aware of the importance of providing timely, personalized, and constructive feedback, a sentiment echoed by T1. In a student-centric perspective, there is a keen interest in various types of digital formative assessments, highlighting preferences for environmental friendliness, flexibility, and quick feedback. This resonates with [134] findings, emphasizing the positive student experience and motivation derived from technology-enabled assessments.

The interconnected insights from faculty and students underscore a cohesive progression towards effective and engaging educational practices.

Despite the perceived usefulness and benefits of using SM platforms for assessments, the complex nature of SM triggers some potential drawbacks while using it for learning. Güney's [134] study address the pitfalls of utilizing SM for enhancing leaning including privacy concerns of personal information, possibility of distractions, cyberbullying, internet addiction, misinformation, and information overload. In addition, Sehapi [135] mentions other drawbacks such health-related issues, exposure of inappropriate contents, emotional detachment, and miscommunication. Hence, it is crucial to strike a balance among its benefits and potential harms to ensure that it is utilized in a responsible and sustainable way. The integration of SM tools within curricula should be approached with caution and careful considerations of these pitfalls to harness the power of SM and enhance learning experiences.

4.3. Suggestions for Better SM Integration in HEIs

4.3.1. Improving Learning, Teaching and Assessment (L-T-A)

Faculty emphasize the importance of a successful digital transformation, underscoring that educators need not be IT experts but should possess digital literacy skills. P4 articulates this by stating, "Educators need to be aware. . . all you need is digital literacy skills quipped with engaging didactic approach" (P4). This aligns with the notion that real-life learning, rather than technology alone, engages students, as emphasized by P11 and supported by [136].

In the realm of assessments, faculty call for a reevaluation, advocating for the incorporation of authentic assessments in the era of AI. P2 proposes a reconsideration of assessments in the GPT era, focusing on real-life contexts. The shift away from memorization-based assessments is encouraged, aligning with Polisca et al. [137], alongside the promotion of digital formative assessments [57,136]. Monetary incentives are suggested by faculty as a means to encourage the integration of SM tools into teaching. P4 recommends linking technology use to faculty appraisal, promotions, or contract renewal.

Innovative pedagogical approaches are highlighted by faculty, with a preference for blended learning and flipped classrooms. P6 underscores the importance of giving students teaching roles, echoing the insights of Chung [138] and Haapaniemi et al. [139]. Autonomy, both for educators and students, is encouraged, as supported by Muhammad [140].

Engaging digital content is seen as crucial by both faculty and students. P6 suggests making slides more attractive, a sentiment echoed by student S5. The importance of digital applications for creating an engaging learning environment is emphasized by Haleem et al. [45]

Finally, faculty stress the need for improved student-faculty relationships, with faculty members acting as mentors. P9 emphasizes the significance of communication to avoid redundant work. Learning-to-learn strategies are considered vital, enhancing self-learning [141].

4.3.2. Better Integration of SM Tools into Curricula

This sub-section explores faculty and student perspectives on integrating social media (SM) into education. Faculty members express openness, emphasizing strategic planning and alignment with learning goals. From considerations of privacy to the practical use of emerging technologies like Chat GPT, the discussion spans diverse aspects of SM integration. Faculty suggest SM for marketing and research, while also addressing sustainability and influencers. The section concludes with a call for institutional training and presents a proposed framework for maximizing SM's potential in education.

Faculty recognize the potential of integrating SM into curricula, contingent upon course needs, professor and student motivation, and the alignment with educational objectives. All faculty interviewed express willingness to embed SM platforms strategically, emphasizing the importance of clear strategies to maximize benefits and integration into

assessments and curricula. For example, P1 expresses openness to new strategies that serve students' interests and learning objectives, underlining the need for effective policies and strategies [50]. Furthermore, instructional design specialist T1 adds a layer of practicality, suggesting the incorporation of free tools in classroom modules, highlighting their role in collaboration and engagement. P4 emphasizes the careful planning required for SM integration, considering learning outcomes and student adaptability, while stressing the alignment of educational goals with SM activities and awareness of privacy and data security.

To proceed with the topic of SM integration, faculty members view SM platforms as complementary tools that enhance teaching and learning, facilitating engagement with stakeholders (P1). P3 underscores the role of digital technologies in transitioning education into a 21st-century model, addressing student needs and skill development. To encourage faculty acceptance, T1 emphasizes the importance of evidence-based practice and literature support. This approach minimizes technology resistance and fear, aligning with studies advocating for critical awareness and understanding of the benefits of online transitions [52,53,142].

Next, faculty delved into the pedagogical approach of integrating SM platforms, emphasizing participative learning environments that foster open discussions, debates, collaboration, and critical thinking skills. T1 advocates for the integration of open-educational resources, solving copyright issues, while students express interest in faculty guidance on useful SM accounts (S4). This aligns with the literature suggesting that incorporating familiar digital platforms enhances student motivation and engagement [100,102,143,144].

The discussion extends to the use of Chat GPT, recognized as a valuable tool by faculty (P9) and students (S4). While its potential benefits are acknowledged, faculty stress the need for proper utilization, training, and ethical considerations [145]. The role of incentives, such as bonuses or extra grades, is proposed to motivate students to share content from SM platforms.

Moving beyond academic SM platforms, faculty members suggest the use of platforms like X for research analysis (P2) and YouTube for real case studies (P1, P6). The potential for educational marketing through SM platforms is also highlighted as a means to reach young adults globally (P7). Regarding sustainability, faculty and students propose the use of SM tools to spread knowledge, awareness, and practices. Influencers are seen as key players in sustainability outreach, emphasizing their impact on shaping mindsets and behaviors (P6, S5). The need for SM algorithm understanding to filter content is stressed by the instructional design specialist (T1).

Lastly, both faculty and students call for institutional training on the proper use of SM platforms for learning. Lack of training is identified as a major cause of dissatisfaction among educators with technology use [146,147]. The proposed framework, depicted in Figure 12, synthesizes these insights, providing a comprehensive approach to maximize the potential of SM platforms in education. Figure 13 depicts SM as a core for developing sustainability competencies and theoretical assessment framework that facilitate participative sustainable learning and driving d-E*f*S to become a reality in actions in the context of modern social learning.

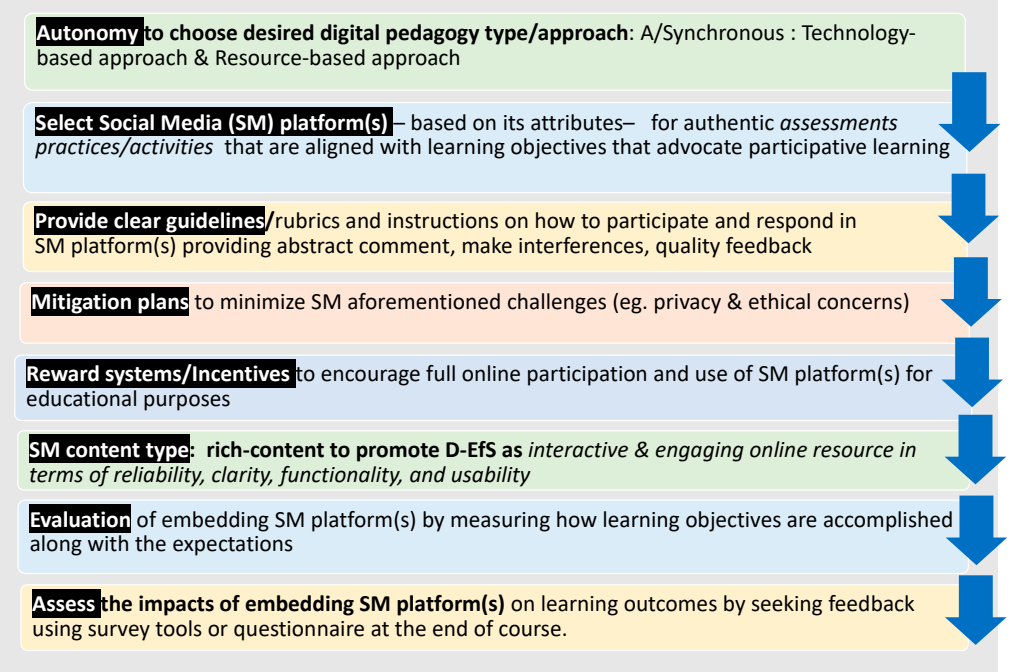

Figure 12. Proposed framework to improved digital education enabling SM integration to ensure self-, peer- participative- and active-learning.

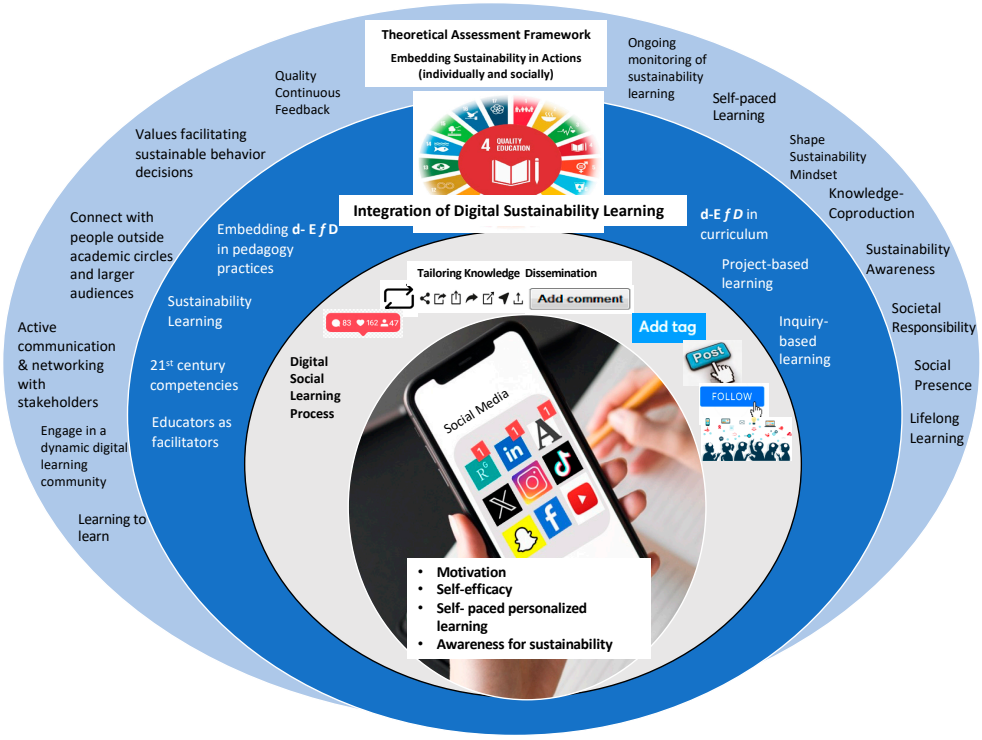

Figure 13. Social Media as a vital tool for promoting diversity of formative assessments that ensure integration of d-E*f*S and sustain participative and active learning.

5. Conclusions, Recommendations and Limitations

The recent pandemic placed more emphasis on digital learning making it increasingly crucial and making its integration imperative for future learning and teaching within HEIs. Similarly, the rise of SM usage, especially in countries such as Qatar, has prompted a paradigm shift in pedagogical practices within HEIs, with educators exploring their

integration for digital learning in the 21st century. Despite a scarcity of research on the role of SM platforms in digital and participative learning, teaching and assessment (d-LTA), this study recognizes the opportunity presented by the exponential growth in SM users, especially among young adults, urging HEIs to investigate their educational potential. The research addresses the gaps in the literature by examining the current pedagogical practices and assessment practices involving SM platforms in the context of learning, particularly in a university setting in Qatar as a case study, aiming to achieve effective learning and foster a dynamic online learning community. The study also explores the intersection of learning the sustainability concepts through SM platforms as a case study, contributing to the evolving body of literature and emphasizing the need for localized sustainability-related content in SM platforms and curricula.

Among the findings highlighted in this study, faculty members were found to be actively incorporating SM platforms and websites of professional nature—such as LinkedIn and ResearchGate—into curricula to prepare students for future employment, while students were utilizing their existing SM accounts—despite their numerous shortcomings—for some learning, although not all for formal education, purposes, fostering autonomous and socially collaborative learning. However, challenges persist in incorporating the learning and gaining of sustainability knowledge and practices within higher education, revealing a disconnect between sustainability objectives and course outcomes.

To address these challenges, the study proposed a framework for an effective integration of SM within educational settings, which could be implemented and tested through a course at a local university as a future step using social media platforms. The proposed framework for integrating SM into educational settings represents a novel contribution, as it combines learner-centric approaches with sustainability principles to enhance both learning outcomes and sustainable practices. This framework not only supports the development of critical soft skills and digital literacy but also promotes lifelong learning and adaptability, aligning with contemporary educational paradigms such as Education 5.0. The contents will be based on a digital curriculum through a learner-centric approach using inquiry-based learning, participative learning, and reflection to actively promote sustainable living and achieve sustainable community. The study's limitations include a gender imbalance among the 20 stakeholders involved in semi-structured interviews, as well as a lack of wide representativeness of the sample that make generalized conclusions ill-informed and limited. Additionally, more quantitative research and analysis is needed to better understand the stakeholders' perceptions on a wider scale. Future research recommendations include larger-scale interdisciplinary studies, experimental approaches to assess factors influencing acceptance of SM platforms, exploration of SM influencers' roles in sustainability content, and investigations into overcoming barriers to integrating disseminating SM platforms into HEI curricula in Qatar. Furthermore, future studies may address SM pitfalls and develop a mitigation plan for better integration of SM into university curricula. Continuous monitoring of faculties' and students' changing perceptions regarding SM platform usage for academic purposes is also suggested for further research.

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Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of HBKU (protocol code2023-116 and dated 28 February 2023).

Informed Consent Statement: We conducted semi-structured interviews while ensuring the anonymity of all participants and guaranteed anonymity. Before conducting the interviews, all participants were informed of the purpose of this study and how their data would be used for research purposes, and

they only signed the consent form if they agreed to be part of the study with the promise of full confidentiality. Informed consent was obtained from all participants involved in the study.

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