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ORIGINAL RESEARCH ARTICLE

Integrating Sustainability in Higher Education Curriculum: Big Ideas for Change (A Review Article)

Fateme Gozin¹ Javad Hatami²

¹PhD candidate in Educational Studies, Faculty of Humanities, Tarbiat Modares University (TMU), Tehran, Iran. (Corresponding Author). Email: f.gozin@modares.ac.ir, ORCID: 0000-0002-1028-8349

²Professor in Educational Technology, Faculty of Humanities, Tarbiat Modares University (TMU), Tehran, Iran. Email: j.hatami@modares.ac.ir, ORCID: 0000-0002-4517-2039

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ABSTRACT

Purpose: There is a perceived need to develop approaches, methods and tools that may help higher education institutions to systematically introduce the Sustainable Development Goals (SDGs) into research and teaching as an intrinsic part of their programs. It seems that the core of the sustainability curricula comprises a paradigm shift that is not only reflected in university teaching but also permeates the entire institution. This paper investigates the big ideas which could orient and accelerate this paradigm shift.

Method: Among 112 articles, 77 articles were selected according to inclusion criteria. The MAXQDA software was used for extracting the big ideas. During the analysis, the included studies were investigated and coded. Afterwards, the themes that had emerged among the studies were highlighted. Once themes were identified and defined, the similar and related categories into the theme that best described the purpose of study were adopted and ultimately the big ideas were defined.

Findings: The findings suggest seven big ideas; Namely: whole system change & collective capacity, whole person learning, truly integrative curriculum, whole institutional approach, resolute leadership & strategic planning, intelligent accountability & wisdom.

Conclusion: This paper suggests a process-oriented collaborative approach toward SD change in HEIs which could help leaders and policy-makers adopt appropriate orientation toward strategic planning and acting. The scientific contribution of this paper value lies in the fact that this is one of the first papers to mention the need for procedural big ideas which caters to a more systematic integration of the SDGs in university programs.

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1. Introduction

Higher education institutions (HEIs) have been at the forefront in creating and breaking paradigms, and educating the future decision-makers, entrepreneurs, and leaders. In the last decade, there have been many efforts to develop sustainability competences in HEIs to ensure that students are prepared for challenges in making societies more sustainable (Lozano et. al., 2022).

Analyzing the impact of higher education on sustainability has shown that higher education contributes decisively to the SDGs implementation, and as a transformational agent, the higher education sector has a tremendous impact on students' habits and contribution to a prosperous society (Žalėnienė & Pereira, 2021).

Research into and practice of Higher Education for Sustainable Development (HESD) have been increasing during the last two decades. These have focused on providing sustainability education to future generations of professionals and integrating sustainable development (SD) into the system elements of HEIs (Lozano et. al., 2017). However there have been limitations. In some universities, education for sustainable development is already included in their study programs, but a deeper analysis of specific details - such as the online description of unit courses shows a limited presence of the SDGs in the curriculum and syllabus. Also, many universities perceive the need for improvements in teaching and learning about sustainable development, but the awareness about the SDGs in many HEIs is still lacking (Leal Filho et. al., 2021b).

In some HEIs, experiential learning activities are carried out to stimulate students to become engaged in SDG issues or to enhance discussions about climate change but these initiatives are largely isolated. Furthermore, some case studies offer insights about actions to implement the SDGs at HEIs or to stimulate students' awareness of sustainable development in general and on specific SDGs, such as economic development, resilience, and inclusion, in particular. Despite some interesting results, previous studies are often limited to some modalities of HEIs or to unique case studies, without any possibility to generalize findings and conclusions (Leal Filho et. al., 2021b).

It seems that the core of the sustainability curricula comprises a paradigm shift in Higher education that is not only reflected in university teaching but also permeates the entire institution (Weiss et. al., 2021 a), which is a complex task. Therefore, many HEIs struggle today on how best to incorporate the SDGs in their operations (Weiss et. al., 2021a).

An analysis of the literature identifies the fact that currently there are few guidelines or frameworks to systematically implement the SDGs in university programs (Leal Filho et. al., 2021b).

Therefore, we were looking for the most basic guidelines (big ideas) that help realizing the process of integrating sustainability into HEIs. The question was: "what are the most basic principles and guidelines (big ideas) that make higher education paradigm shift towards sustainable education possible?"

2. Literature Review

The widespread acceptance of sustainability was initiated by the report published by the Brundtland Commission in 1987 titled "Our Common Future". In that report, sustainable development was defined as "development that meets the needs of the current generation without undermining the ability of future generations to meet their own needs." The report emphasized the importance of sustainable development at a level more than its intrinsic value to ensure there is enough resources to meet the requirement of the future generations. A plethora of attempts have been made to define sustainability since then emphasizing its importance. Today, sustainability is most popularly defined in terms of the three associated dimensions: social, economic, and environmental (Scott, 2017).

The concerns about sustainability indicate that the current way of producing, organizing, consuming, living, etc. may have many negative effects on the future. In short, the current way of 'doing things' is not very sustainable. Therefore, some 'matters' have to change (Scott, 2017).

In 2015, the UN General Assembly adopted seventeen Sustainable Development Goals (SDGs) to be achieved by 2030. The aim of these seventeen goals is "to secure a sustainable, peaceful, prosperous and equitable life on earth for everyone now and in the future" (Žalėnienė & Pereira, 2021).

SDGs describe major development challenges crucial for the survival of humanity. For the goals to be reached, humans require a profound transformation of how to think and act. To be able to do so, people need to require the knowledge, skills, values, and attitudes that empower them to contribute to sustainable development. Thus, it is stated that education is crucial for the achievement of sustainable development (Pálsdóttir & Jóhannsdóttir, 2021).

The Incheon Declaration describes education as a "fundamental human right and the basis for guaranteeing the realization of other rights". Quality education (Goal 4) is key to achieve all the SDGs. UNESCO highlights it as the most effective way to meet all SDGs to act towards sustainable development. Education is at the frontline of any development from primary school to tertiary education and lifelong learning. UNESCO defines ESD as a source of empowerment for the learners "to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity" (Leicht, Heiss & Byun, 2018).

Universities play a key role in fostering sustainable development, and it is considered the fundamental responsibility of universities to engage in the realization of the SDGs, including moral imperatives ensuring the success of the SDGs as part of their social missions and core functions (Pálsdóttir & Jóhannsdóttir, 2021).

The possible contributions of universities to the SDGs are manifold. However, previous studies highlighted the importance of identifying further advantages of embedding SDGs in key areas (Leal Filho et. al., 2021b), These areas are:

- a) Research and development
- b) Learning and teaching
- c) Governance and campus operations
- d) Civic engagement and community outreach

Many attempts have been devoted to integrating sustainability into higher education, however it seems to be still way to go.

3. Method

To explore the aim of the study, literature review was utilized. The literature review allows for a methodological approach of uncovering and categorizing relevant articles concerned with the issue that have been published in scientific journals from previous bodies of research. The literature review involves an initial collection stage where through searching for relevant articles and topics of interest, a collection of articles from scientific peer-reviewed journals is established. Furthermore, the collected articles go through a filtering and selection process wherein the remaining relevant articles are further analyzed and included within the review (Al-Nuaimi & Alghamdi, 2022).

In this study initially, a web-based literature search was conducted using such search phrases as "sustainability in higher education", "integrating sustainability in the curriculum", "embedding sustainability into the higher education curriculum", etc. The search included grey literature, using reference lists and citation searching from published papers. Studies selected were (1) published in English, (2) were specifically on integrating sustainability in the

curriculum, (3) both quantitative and qualitative studies, (4) were done after 2015, (5) contained peer-reviewed articles, book sections, conference proceedings & reports. The search of the databases retrieved 112 records, 17 papers were not available for the authors, and following screening, a total of 67 instances of integration were found. 10 records were added to the data source from previous years (before 2015) while investigation, according to article citations. Thus, a total number of 77 records were investigated. (Figure 1.)

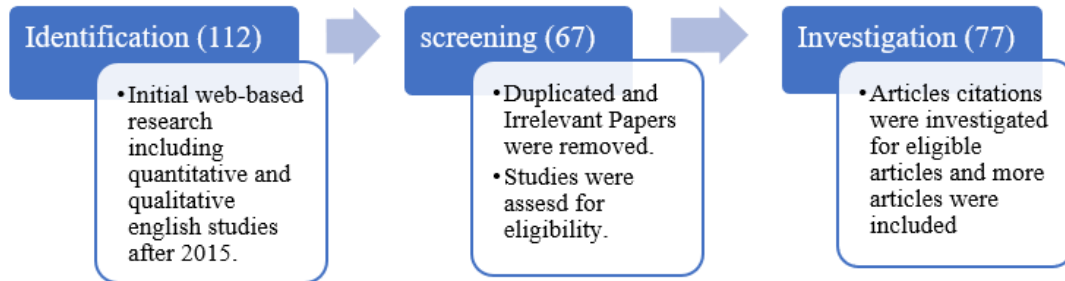
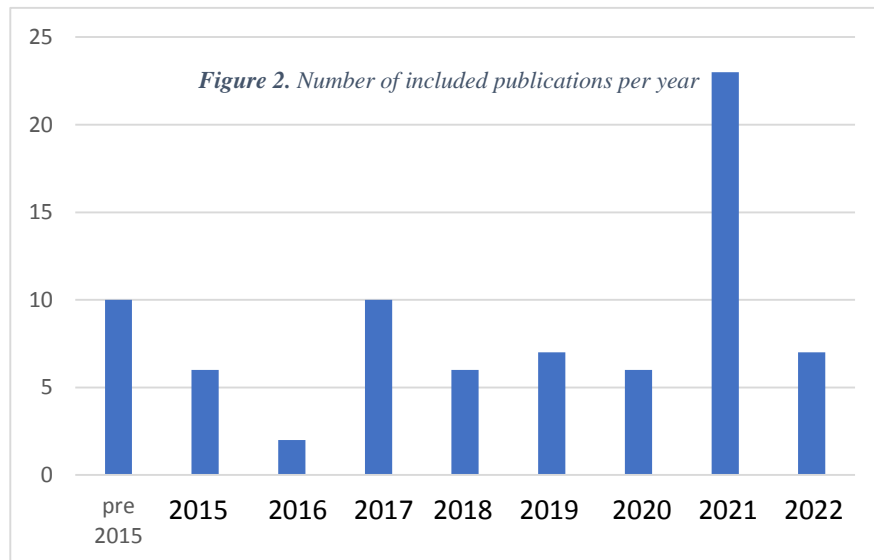


Figure 1. Data selection process

The number of included publications per year is pictured in Figure 2.



The included 77 publications were entered into the MAXQDA software. For the purpose of initial review, parts of the study articles were tagged and coded, so that the researchers could familiarize with the data. Afterwards, all of the studies were investigated and coded. During the analysis, the themes that had emerged among the studies were highlighted. Once themes were identified and defined, the similar and related categories into the theme that best described the purpose of study were adopted and ultimately the big ideas were defined. (Figure 3.)



Figure 3. Theme extraction process

4. Findings

In this study we found 7 big ideas toward sustainable transformation of HEIs (Figure 4). These ideas will be elaborated below.

- 1- Whole system change & collective capacity
- 2- Whole person learning
- 3- Truly integrative curriculum
- 4- Whole institutional approach
- 5- Resolute leadership & strategic planning
- 6- Intelligent accountability

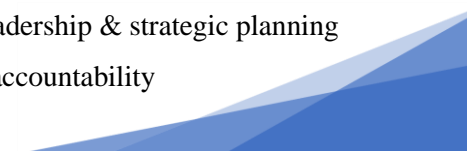


Figure 4. Gozin & Hatami: Big Ideas Toward Sustainable Transformation in HEIs

4.1. Whole system change & collective capacity

Whole systems change means that every vital part of the whole system - school, community, district, and government - contributes individually and in concert to forward movement and success (Fullan, 2010).

Systems thinking argues that valid knowledge and meaningful understanding comes from building up whole pictures of phenomenon, not by breaking them into parts. Given the complexity of this subject area - involving worldviews, the nature of sustainability, policy and practice in higher education, organizational learning, and transformative change - a systems perspective which seeks to illumine the relationships involved is both necessary and helpful. This includes seeing whole educational systems and individual institutions as complex systems, and the sets of ideas that inform them as belief systems (Sterling, 2005).

This appears to entail a shift of emphasis from relationships based on separation, control and manipulation towards those based on participation, appreciation and self-organization. Also, this change involves a shift from the influence of mechanism towards the promise of a living systems or ecological metaphor. The emergent postmodern ecological paradigm suggests a change of epistemology, from reductionism towards holism, from objectivism towards critical subjectivity, and from relativism to rationalism. Without the deep learning that this implies, on the part of policymakers, administrators, curriculum developers, lecturers and all the actors in higher education, the response of HE to sustainability is always likely to be accommodatory rather than transformative” (Sterling, 2005).

This calls for what Fullan (2010) terms ‘collective capacity’. “Collective capacity is when groups get better. The big collective capacity and the one that ultimately counts is when they get better conjointly—collective, collaborative capacity, if you like. Collective capacity generates the emotional commitment and the technical expertise that no amount of individual capacity working alone can come close to matching”.

Therefore, if sustainability is the aim, the change begins through a collaboration on many levels, involving faculties, institutions, managers, administrators, lecturers, researchers, students, and various stakeholders outside universities. In this process, it is important that people involved in the implementation of sustainability in higher education cooperate and learn from one another. Active education policy reconstruction, global cooperation between universities in diverse contexts and the courage of the lecturers to raise edgy questions about injustice are core elements in this transformation (Wolff & Ehrström, 2020).

In this regard, a meta-study on 133 case studies from universities around the world by Weiss et. al. (2021b) highlighted the role of different stakeholders: “State and federal laws and public

funding determines the extent to which implementation of curriculum change is specified or supported. Furthermore, the call of employers and professional associations for employability and new competencies like the need for sustainability skills influence curriculum changes. Also, recognition of sustainability by society at large can lead to a call for new programs. Finally, NGOs can act as supporting stakeholders, too. These influences have been investigated for general organizational change in higher education, and in several case studies on sustainability curriculum implementation.”

Furthermore, a body of studies highlight community collaboration and outreach by HEIs as key to SD (Budihardjo et. al., 2021; Elmesah et. al. 2022, Weiss et. al., 2021b; Leal Filho 2021b). HEIs “situate themselves within the larger community in which they reside” and are called to be “a contribution to society”. Increasingly, there is a greater demand placed on HEIs to be accountable to the communities that they inhabit. (Wright et. al., 2022)

Wright, Ritter & Gonzales (2022), presented a case study from Wingate University’s Collaborative for the Common Good (CCG). The data from their study showed that an intentionally collaborative infrastructure provided a unique opportunity for this university to meet the needs of the campus and community despite their many social, economic, and cultural challenges that were exacerbated by COVID-19.

It seems that the more collaborative, whole system approach could be performed, the deeper the transformation would happen.

4.2. *Whole Person Learning*

“We the peoples” are the celebrated opening words of the Charter of the United Nations. It is “we the peoples” who are embarking today on the road to 2030. Our journey will involve Governments as well as parliaments, the United Nations system and other international institutions, local authorities, indigenous peoples, civil society, business and the private sector, the scientific and academic community — and all people. It is an Agenda of the people, by the people and for the people — and this, we believe, will ensure its success (United Nations, 2015).

It is certainly our experience that sustainability education is often viewed as a linear process involving the transmission of knowledge about sustainability issues. This involves focusing on inputs (content) and outcomes (attributes/behaviors) based on the belief that there is a linear and causal relationship between the two. However, education is a multidimensional process with different domains which need to be kept in balance. While education includes the transfer of knowledge and recognizes the value of ‘qualification’, it also promotes ‘socialization’ and what has been termed ‘subjectification’ – that is opportunities for learners to engage with the world and to understand their place within it (Kemp & Scoffham, 2022).

It brings into view whole-person learning from the inside-out as an identity-shaping process, guided by personal values. Sustainability-oriented learning processes that emphasize inner and personal spheres of transformation, highlight learning outcomes towards increased self-efficacy and confidence, motivation, agency and commitment to action as well as meaning and hope (Holmén et. al., 2021).

Thus, ESD requires an action-oriented, transformative pedagogy, which supports self-directed learning, participation and collaboration, problem-orientation, inter- and trans- disciplinary and the linking of formal and informal learning (Rieckmann et. al., 2017). This dimension of learning is increasingly being stressed in the literature (i.e., Wamsler, 2020; Demaidi & Al-Sahili, 2021; Lozano, 2022).

In this regard, different pedagogical approaches have been proposed by several authors and/or used in different HEIs; including problem-based and project-based learning strategies (Vemury et. al., 2018; Álvarez et. al., 2021; Birdman et. al., 2022;), service-learning (Busquets et. al., 2021), internships in communities, businesses, and governments (Brundiers et. al., 2010),

discourse (Buchtele & Lapka, 2022), backcasting (Kelly, 2021; Holmén et. al., 2021), case studies, community service learning, jigsaw/interlinked teams, participatory action research, eco-justice and community, place-based environmental education, and supply chain/life cycle analysis (Lozano et. al., 2017), etc.

Only such pedagogical approaches make possible the development of the key competencies needed for promoting sustainable development (Rieckmann et. al., 2017).

Competencies describe the specific attributes individuals need for action and self-organization in various complex contexts and situations. They include cognitive, affective, volitional and motivational elements; hence they are an interplay of knowledge, capacities and skills, motives and affective dispositions. Competencies cannot be taught, but have to be developed by the learners themselves. They are acquired during action, on the basis of experience and reflection (Rieckmann et. al., 2017).

The development of sustainability competences in HEI can lead to more sustainability literate decision-makers, leaders, scientists, and professionals, and thus, better address the pressing challenges that ail our societies and Earth (Lozano et. al., 2022).

Many studies have investigated the sustainability competencies needed for individuals. Leal Filho et. al. (2020) have reviewed these studies (Table 1.).

Table 1. Sustainability Competences (Leal Filho et. al., 2020)

Authors	Sustainability Competences
Barth et. al. (2007)	Seek interconnections, independence and partnerships; understanding cross-cultural cooperation for more flexible views; participation and capacity
Wals (2011)	Think prospectively and to deal with uncertainty; work in an interdisciplinary manner; achieve open-minded perception; cross-cultural understanding and cooperation; participatory competency; planning and implementation competency; the ability to feel empathy; motivate oneself and others; reflect at a distance on individual and cultural concepts; and sympathy and solidarity
Wiek et. al. (2011)	Systems thinking, strategic, anticipatory, normative and interpersonal competence (across-cutting key competence in sustainability)
Rieckmann (2012)	Anticipatory thinking; interdisciplinary work; systemic thinking and handling of complexity; cooperation in (heterogeneous) groups; participation; planning and realizing innovative projects; empathy and change of perspective; ambiguity and frustration tolerance; critical thinking; acting fairly and ecologically; communication and use of media; and evaluation
Wals (2014)	Competences to work in an interdisciplinary environment; acquire interconnections, interdependence and partnerships; flexible visions, cross-cultural understanding and cooperation; participatory competence; competence/capacity for planning and implementation; ability of empathy, sympathy and solidarity; personal motivation and among others; and understanding competence of distinct behaviour and cultural vision
Gombert-Courvoisier et. al.	Planning and implementation capacity; empathy, be nice and have solidarity; personal and group motivation; and understanding of distinct behaviour and cultural insight
Lozano et. al. (2017)	Systems thinking; interdisciplinary work; anticipatory thinking; justice, responsibility, and ethics, critical thinking and analysis; interpersonal relations and collaboration; empathy and change of perspective; strategic action, personal involvement; tolerance for ambiguity and uncertainty
UNESCO (2017)	Systems thinking; anticipatory thinking: normative and strategic thinking; collaboration; critical thinking: self-awareness; integrated problem solving
Brundiers et. al. (2020)	A combination of integrated problem solving, interpersonal, implementation, strategic-thinking, value-thinking, future-thinking, and system-thinking competencies

Competence-based education offers great opportunities to re-examine and reorient educational policy and systems towards sustainability. The further integration of competences for SD, especially paying attention to those competences linked with future orientation, system orientation, personal involvement, and action skills, should substantially contribute to a truly integrative approach towards ESD (Lambrechts et. al., 2013).

4.3. Truly integrative sustainable curriculum

One of the most widespread frameworks for understanding how sustainability is integrated in curriculum is that proposed by Sterling and Thomas (2006) (Table 2.), ranging from denial (no change), ‘bolt-on’ (education about sustainability), ‘build-in’ (education for sustainability), and redesign (education as sustainability) (Weiss et. al., 2021b).

Table 2. Sustainability integration rate (Sterling & Thomas , 2006)

Level	Type of ESD	Description	Pedagogical Approach
High/strong	very redesign Education <i>as</i> sustainability	-holistic change and paradigm shift that place sustainability principles, ethics, and values at the core of the curriculum requiring the engagement of the whole person and institution -ESD is integrated into common core requirements and/or the vision of the HEI	emancipatory & transformative (third-order learning)
Middle/strong	“built-in” Education <i>for</i> sustainability	-significant changes to the curriculum by including a coherent coverage of content, values, and skills associated with sustainable development and a critical questioning of assumptions -sustainability is addressed in (interdisciplinary) programs/courses focusing on integrating sustainability issues -first linkages from ESD modules to other HEI areas such as operations/campus	
Low/weak	“bolt-on” Education <i>about</i> sustainability	-leaves current paradigm change unchallenged -sustainability concepts are added to specific disciplinary existing courses or programs (content-based sustainability literacy) -minimal effort from the institution	instrumental & simplistic (first-order learning)
Very weak	denial No change	/	

The ‘bolt-on’ approach is educating students about sustainability as a distinct unit of knowledge. This involves designing new courses that are separate from existing offerings and are just bolted on to the existing curriculum. This bolt-on approach is intended to teach students about sustainability in isolation rather than produce change in subsequent behaviour or decision making. The ‘build-in’ approach is education for sustainability which involves building sustainability into the whole curriculum and which potentially develops a deeper engagement with sustainability (Mburayi & Wall, 2018).

There have been efforts toward building sustainability into the whole curriculum with different focuses. A body of articles focus on integrating SDGs into the curriculum (Leal Filho et. al., 2021b; Chaleta et. al., 2021). Other articles focus on the integration of competences and/or pedagogical approaches for SD (as mentioned before).

Studies have investigated integration of SDGs to competencies (Lambrechts et. al., 2013) or competencies to pedagogical approaches (Lozano et. al., 2022). On this basis a cubic model for an integrative sustainability curriculum could be synthesized (Figure 5.).

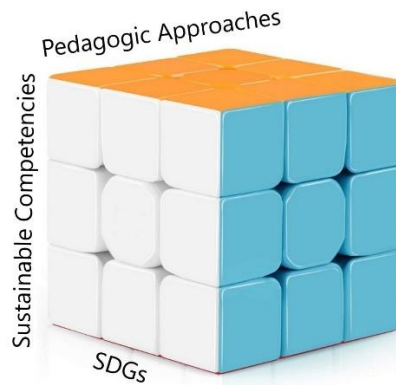


Figure 5. Gozin & Hatami: Cubic Model proposed for an integrative sustainability curriculum

Moreover, the ‘build-in’ approach requires multiple disciplines and interdisciplinary or transdisciplinary programs since sustainability is a broad canvas covering several areas and aspects. Studies have introduced different methods in this regard; i.e., journal clubs (Kelly, 2021), multi- or transdisciplinary research projects (Heilmann & Reinhold, 2017), real laboratories (Zinn & Isenmann, 2017), etc.

However, the strongest transformation (redesign) happens when sustainability extends beyond education into all domains of the institution. This change is transformative, affects university leadership, faculty, students, and staff. (Weiss et. al., 2021b).

4.4. Whole institutional approach

HEIs need to find ways to embed SD into their specific norms and values and into the shared goals of their members, and to create common ground so as to enable their organizations to learn sustainability, learning being essential to the achievement of a paradigm shift. “This means a shift from the machine metaphor that informs our view of educational management and the learning process towards a view of the institution as a living system and learning organization”. (Sterling, 2005)

In this regard, Bauer et. al. (2020) state that: “Since sustainable development is a complex concept, and HEIs are complex organizations, it is important to be aware of the implications and requirements of a thorough and comprehensive approach to the introduction of SD. For many HEIs, it will presumably mean making a number of fundamental changes within the institution. “In this context, the word ‘transformation’ is not an exaggeration but a prerequisite”.

Cameron and Quinn (2006) stress the notion that the best way of implementing such major organizational changes is to take the organizational culture into account and shape it in a way that supports such change. “Although the tools and techniques may be present and the change strategy implemented with vigor, many efforts to improve organizational performance fail because the fundamental culture of the organization – values, ways of thinking, managerial styles, paradigms, approaches to problem solving – remains the same”. (Bauer et. al., 2020) Researches in the context of sustainability support their findings in HEIs (Adams, Martin & Boom, 2018, Baker-Shelly et. al. 2017, Dzimińska, Fijałkowska & Sułkowski, 2020, Filho et. al., 2021a)

It seems that integrating sustainability in the culture of HEIs could include a range of elements such as policy, strategy, planning and, governance, (Filho et. al., 2021b) which ultimately could lead to operations around campus, social community, research areas, staff support & training and so on.

4.4.1. Campus: Leal Filho et. al. (2021a) analyzed the current status of sustainability *initiatives* among Latin American HEIs. The results showed a special emphasis on campus operations (i.e., waste management, biodiversity, energy efficiency, reduction of paper consumption, etc.).

Sáez de Cámara, Fernandez & Castillo-Eguskiza (2020) presented a practical case that illustrated integrating SDGs within an institutional setting adopting a holistic approach; three sectoral plans were deployed alongside the core, which chiefly affected university education processes: the gender equality plan (Equality Campus), the inclusion plan (Inclusion Campus) and a health and environmental management plan (Planet Campus). Other studies also put a great stress on the role of campus operations and support their findings (i.e., Marcus et. al., 2015, Weiss et. al., 2021b, Ahlava, Suominen & Rossi, 2017, Braun-Wanke, 2017, Budihardjo et. al., 2021).

4.4.2. Researches: Studies also mention the role of researches (Leal Filho et. al., 2017, Leal Filho et. al., 2021a, 2021b, Budihardjo et. al., 2021, Elmassah, Biltagy & Gamal, 2022): “It seems that the more sustainability is integrated in research, the more likely is a more comprehensive implementation of sustainability curricula”. (Weiss et. al., 2021b) Short seminars to stakeholders, symposiums & conferences, workshops, researches in fields about SD, applied researches about SD, researches in SD theory and principles are some initiative examples towards a more sustainable culture in HEIs (Leal Filho et. al., 2021b).

4.4.3. Staff: Supporting the staff (i.e., educators, deans, researchers, general/administrative staff) and training them has an important role in the process towards a more sustainable culture in HEIs (Gil-Doménech et. al., 2021, Lozano et. al., 2013, Mulà et. al., 2021).

An example is the “Leuphana University of Lüneburg” (LUL) which meets the SDG challenge to provide quality education by supporting university staff and building the teaching competencies of the faculty. The faculty receive support from a teaching service team, in addition to a university-wide teaching development network. Both the team and the network create a community that helps faculty develop and share their challenges and experiences. LUL spread SD awareness through sustainability communication and standards of excellence on and beyond the campus for all the University's stakeholders (Elmassah, Biltagy & Gamal, 2022). Jongbloed et. al. (2021), found out that all support mechanisms were seen as valuable by deans. Yet most heads of academic units prioritized support to further develop their unit's sustainability strategy (63%) followed by the external project funding (61%), staff training opportunities (59%), peer learning or good practice exchange (58%) and support by their own institution (57%).

Although, it seems that the whole institutional approach could help toward more sustainable HEIs, it must be mentioned that there could be some obstacles to whole institution SD integration; i.e., the UNESCO report (2014) points to leadership obstacles that restrict ESD initiatives to the margins (Mulà et. al., 2017).

4.5. Resolute leadership & strategic planning

Successful systems have “resolute leadership” that stays with the focus, especially during rough periods, and these leaders cause others around them to be resolute. It is so easy to go off message, and if you do, you lose whole-system-reform possibilities. This is hard, persistent work but it is not overly complex. Resolute leadership is critical near the beginning when new ideas encounter serious difficulty, but it is also required to sustain and build on success (Fullan, 2010).

Sustainability leadership entails the processes, which leaders, policymakers, and academics undertake in order to implement sustainable development policies and other initiatives within their organizations. It encompasses approaches, methods, and systemic solutions to solve problems and drive institutional policy towards a more sustainable organization (Leal Filho et. al., 2020).

Leadership strongly mediates to what extent curriculum changes in general take place. Leadership for implementing sustainability curricula can unfold in different settings. Internally,

the HEI's vision, commitment, strategic planning, and communication can all absorb sustainability on the leadership level (Weiss et. al., 2021b).

If properly considered and implemented, sustainability leadership may not only lead to an enhancement in the ways an institution engages on matters related to sustainable development but should also lead to a culture of institutional change, assisting an organization in finding the best ways to respond to local, regional, and global challenges (Leal Filho et. al., 2020).

'Precise strategies' is another core idea for HEIs transformation toward sustainability. When you have precision, the speed of quality change can be greatly accelerated. Incredible and convincing transformations can be accomplished in one short year through precision strategies (Fullan, 2010). Studies in the context of sustainability for HEIs highlight the role of strategic planning (Leal Filho et. al., 2018; Weiss et. al., 2021a; Marcus et. al., 2015; Elmassah et. al., 2022).

In the study of Jongbloed et. al. (2021) academic leaders indicated that dimensions most commonly addressed in the academic unit's strategy included 'education strategy' (30%) and 'research strategy' (27%). It was followed by 'operational & administrative strategy (e.g., energy, waste management)' (24%) and 'societal engagement strategy' (19%).

It seems that the more resolute leadership and the better planned strategies could help more toward sustainable HEIs.

4.6. Intelligent accountability

Intelligent accountability involves a set of policies and practices that actually increases individual, and especially collective capacity to the transparent point. (Fullan, 2010)

Follow-up and review based on robust monitoring, reporting and evaluation policies, systems and tools are essential for the achievement of SDG4-Education 2030. Monitoring quality in education requires a multidimensional approach covering system design, inputs, content, processes and outcomes (UNESCO, 2015).

New information, analysis and predictions feed into 'improve[d] decision-making and action-taking' to guide and reorient programmes. This process, if it remains open and participatory, increases understanding about the elements necessary to promote ESD learning in a particular context, and could influence other stakeholders. The desired outcome is wider social learning and enhanced ESD knowledge and skills, potentially resulting in diverse activities that promote not just better learning but the ultimate goal of ESD: sustainable living throughout life. (Stepanek Lockhart, 2018)

4.7. Wisdom

Based on the numerous case studies published thus far, all curriculum change processes in HEIs appear to be unique and involve an individual context and history that impede both drawing comparisons and the ability of HEIs to learn from one another (Weiss et. al., 2021a).

Therefore, instead of a "one-size fits all" approach, a localized approach would be more appropriate in addressing challenges, barriers and incentives, as each campus is a unique micro-environment which is individually impacted by a certain nexus of factors. Also, whatever framework emerges needs to be flexible, to recognize that embracing SP is a developmental journey, and should seek to engage stakeholders, both internal (all staff) and external (i.e., suppliers) (Filho; 2019).

Kemp & Scoffham (2022), presented a conceptual framework, the 'paradox model' (Figure 6.), which places sustainability within the contradictory, messy and uncertain terrain that characterizes Higher Education.

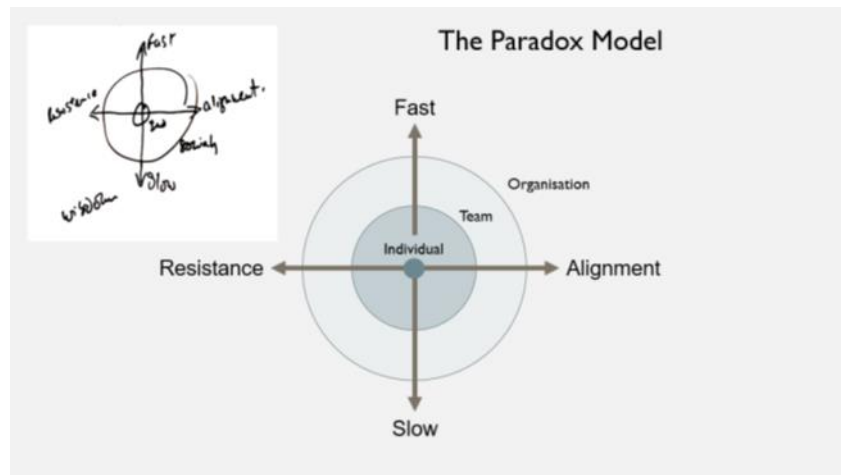


Figure 6. The Paradox Model (Kemp & Scoffham , 2022)

They addressed the paradox between the change nature (which might be resistant and slow) and the societies' demand for immediate action toward sustainability and, suggested that the point where the two axes intersect is particularly significant and provides a place from which to navigate responses both individually, collectively and institutionally. Furthermore, they stated that “there is unlikely to be a single best response to sustainability education – indeed a diversity of responses would be entirely consistent with the ecological principles of diversity and resilience. The flexibility of focus from individual level to teams, programs, faculties and entire institutions acknowledges the interconnections between different parts of a university.” (Kemp & Scoffham, 2022)

Kemp & Scoffham (2022) also argued that wisdom provides a guiding principle for discerning which type of response might be appropriate in any given context:

“It is important to note that wisdom is a pluralistic concept – in other words there are many versions of the ‘good life’. This suggests that rather than being utopian, wisdom can act as an inclusive navigational tool. Given the current environmental emergency, it is arguable that the search for the ‘good life’ must now include Raworth’s challenge of finding a ‘just and safe space for humanity.’ There are also, we believe, strong connections here with Barnett’s concept of the ecological university as a feasible utopia which acknowledges the importance of the journey as well as the destination. This moves us away from seeking a ‘right’ response towards one which is ‘good enough’”.

5. Discussion

In this paper we tried to investigate the big ideas for changing the higher education institutions towards sustainable development.

Marsh and Willis (2006) state that ‘change is a generic term that subsumes a whole family of concepts such as innovation, development, and adoption. It includes changes that can be either planned or unplanned (unintentional, spontaneous, or accidental). It can involve changes at the classroom or [institutional] level or reforms of the whole education system in a country.’

Different models for curriculum change have been proposed. Marsh & Willis (2006) have investigated school changes and grouped the change models under three headings: 1) those that treat change as emanating primarily from influences external to the school, 2) those that treat change as primarily emanating from within the school, and 3) those that treat change as linking external, internal, and personal influences. In general, models in the first group apply to the planned curriculum only, whereas some models in the latter two groups apply to the enacted curriculum.

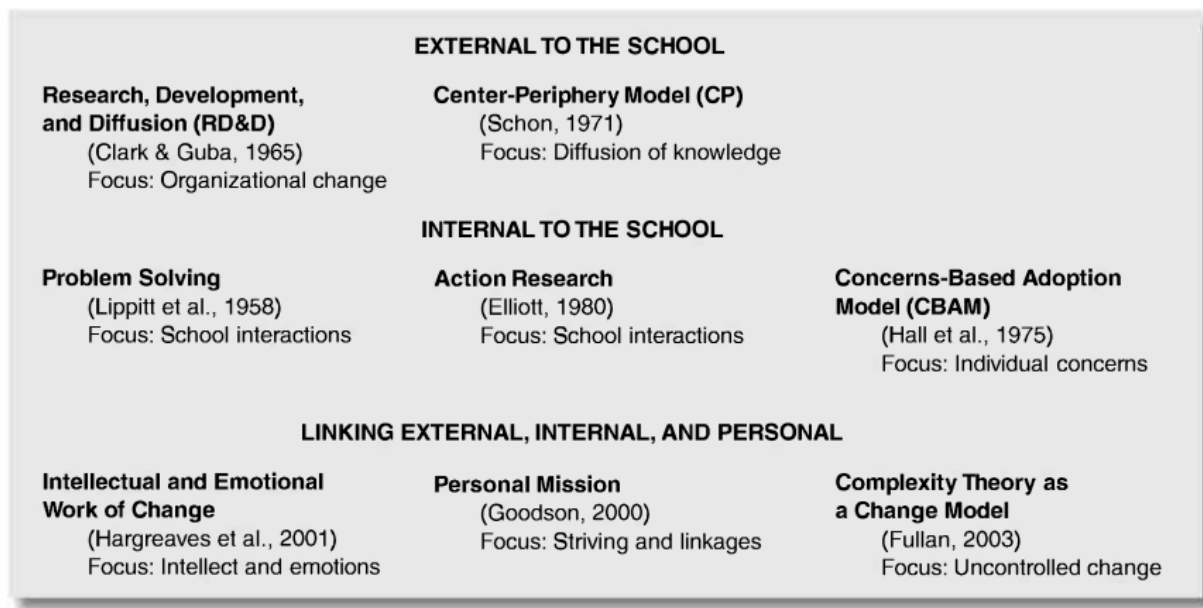


Figure 7. Different Models of Curriculum Change (Marsh & Willis, 2006)

The current literature review revealed that “whole system change & collective capacity”, is a big idea for change. Whole systems change means that every vital part of the whole system - school, community, district, and government - contributes individually and in concert to forward movement and success (Fullan, 2010). Also ‘collective capacity’ notes that the change begins through a collaboration on many levels, involving faculties, institutions, managers, administrators, lecturers, researchers, students, and various stakeholders outside universities. Therefore, it seems that the findings of this study, are consistent with the third group of change models introduced by Marsh & Willis (2006): Linking external, internal and personal.

Moreover, Marsh & Willis introduce ‘personal mission’ (Goodson, 2000) as a subgroup for the third group (figure 7.). It seems that there are similarities between the findings of this study and the ‘personal mission’. The personal model focuses on the influence of both external and internal pressures on those individuals engaged in educational change. The rationale is that: “in the twenty-first century it is simplistic to rely on only external or internal models without linking them to the interests and projects of those people most heavily invested in a particular change. Therefore, it is a mission in this change approach to protect the autonomy of internal change agents who find themselves responding to changes” (Marsh & Willis, 2006). This point of view seems to be consistent with the idea of ‘Whole institutional approach’ that points to the importance of embedding SD into the specific norms and values of university members and into the shared goals of them. ‘Whole institutional change’ also emphasizes the role of staff as change makers: “Supporting the staff (i.e., educators, deans, researchers, general/administrative staff) and training them has an important role in the process towards a more sustainable culture in HEIs”.

Also, it seems that the idea of ‘whole person learning’ is in coordination with the ‘personal mission’ model. ‘Whole person learning’ points out the importance of engaging the students into sustainability issues in order to let them find their selves as agents.

Moreover, Marsh & Willis (2006), noted the complexity theory (Fullan, 2003) as a subgroup for the third group of change models. Fullan (2003), argues that change models need to consider the nature of uncertainty. Fullan's complexity change model does not indicate precisely how to undertake curriculum change; but his value orientation is consistent with what can be considered a process-oriented model of curriculum development with emphasis on both the individual and the organization (Marsh & Willis, 2006).

The nature of current study is in coordination with the idea of complexity theory; The “big ideas” enlighten the possible pathways; however, they don’t obligate any preplanned way. Moreover, the results also confirm this point of view. The idea of ‘wisdom’ notes the uniqueness of any change process and proposes to use ‘wisdom’ as a pluralistic concept which prevents us from predetermining and seeking a ‘right response’ and also “one-size fits all” approach.

Marsh & Willis (2006) have also mentioned a similar issue. They discuss that “despite the usefulness of considering the process of curriculum development and change in terms of the models, models are no substitute for a deep intuitive understanding of the process itself. Deep understanding of the process can best be encouraged by attempting to identify directly the most basic principles and guidelines involved in educational change, not through attempting to identify models, which necessarily rarefy the process to some degree.”

In another study, MacDonald (2003) introduces three approaches to curriculum reforms: 1) Top-down, 2) Bottom-up & 3) Partnerships.

In the context of ‘top-down’ reforms, the educational purposes, and the teacher, play a subsidiary role to those of educational administrators and curriculum writers. The goal is the achievement of high levels of fidelity between the conception and practice of curriculum reform. However, Curriculum innovations were invariably transformed between conception and implementation, and local forces (including the teacher and the school environment) played a key role in the apparent ‘slippage’ between conception and practice (MacDonald, 2003).

‘Bottom-up’ reforms appeared by the emergence of new approaches such as school-based curriculum development (SBCD) and action research and began to consolidate a trend towards locating schools and teachers at the center of reform efforts. However, what occurred were less demanding, poorly resourced and loosely assessed curricula (MacDonald, 2003).

MacDonald (2003) proposes a third approach to reform: ‘partnership’ which involves collaborative relationships between administrators, curriculum developers, professional associations, researchers, teacher educators, teachers, and parents. Such partnerships, in Fullan’s terms, involve ‘across-boundary collaboration’ (MacDonald, 2003).

MacDonald (2003) also argues that in our postmodern era it is needed to think about reforms in a more ‘postmodern’ way:

- moving towards an open system with constant flux and complex interactions;
- requiring interactive and holistic frameworks for learning, with students becoming knowledge-producers rather than knowledge consumers.
- transformative rather than incremental with respect to change. Such change requires errors, chaos and uncertainty through the actions of the learners, and should bypass bureaucratic control that operates in oppressive ways.

As mentioned before, it seems that the results of this study confirm MacDonald (2003) in multiple ways: emphasizing the need for collaboration, giving agency to change-makers and praising the uniqueness of each change systems by wisdom.

In a recent study, Weiss et. al. (2021a) performed a meta-study and cluster analysis, investigating 131 international case studies to find implementation processes that lead to the institutionalization of sustainability curricula in HEIs. They found six distinct implementation patterns: (1) collaborative paradigm change, (2) bottom-up, evolving institutional change, (3) top-down, mandated institutional change, (4) externally driven initiatives, (5) isolated initiatives, and (6) limited institutional change. Although the focus areas might be to some extent different (Weis. et. al. mostly focused on change implementation patterns), similarities can be seen in the results:

“ESD can be implemented from the bottom-up, from the top-down, or both, and the impetus can stem from manifold external or internal stakeholders. To achieve more comprehensive ESD

implementation, open communication among all stakeholders should be facilitated and feedback as well as reflection encouraged. Maintaining a unified vision statement and active participation of all stakeholders fosters a sense of ownership in ESD implementation and ensures that it will be long-lasting. Collaboration between isolated ESD initiatives and various stakeholders leads to shared knowledge and resources. Strong informal collaboration and communication can compensate for a lack of formalized leadership support from the top.” (Weiss et. al., 2021a).

In addition to the results of Weis et. al. (2021a), the results of the current study bold out the importance of curriculum design and pedagogy in ESD changing process.

Since the nature of ‘sustainability’ is complex and interdisciplinary (like most other world issues) it seems to be significant to consider this nature in the curriculum design. This helps students to see the sustainability issues more holistically and also find more holistic solutions. Moreover, it seems to be important for ESD to have an action-oriented, transformative pedagogy, which supports self-directed learning, participation and collaboration, problem-orientation, inter- and trans- disciplinary and the linking of formal and informal learning (Rieckmann et. al., 2017).

6. Conclusion

The findings of the study suggest that the transformation process of HEIs toward SD could be accelerated through adopting a number of big ideas. Namely, whole system change & collective capacity, whole person learning, truly integrative curriculum, whole institutional approach, resolute leadership & strategic planning, intelligent accountability and, wisdom.

We focused on the process and nature of change, since it seems that any changing system could be unique in its context, therefore models might not be as much applicable as procedures.

The implication of this work is strategic. Many HEIs struggle today on how best to incorporate the SDGs in their operations. In order to move forward, the big ideas developed and presented in this paper may help organizations to find out the different areas where the action is needed. Also, the big ideas suggested in this study could help leaders and policy-makers to adopt appropriately oriented strategies and act on that basis.

The unique contributions from this paper to knowledge is that the paper is one of few that suggests the big ideas for SD change in HEIs. It could help the need for strategic orientation of HEIs toward more systematic introduction of the SDGs in university programs at different levels.

A weak point in this study might be the methodology, therefore future studies with more accurate meta-analysis process is suggested.

Also, there are still many research gaps, which could be addressed in future research.

One of them is, for instance, the need to define reliable indicators, and accountability procedures and systems which might play a key role in reform process and system transparency. Further, research is needed on how to prioritize the achievement of specific goals, without endangering others (Leal Filho et. al., 2021).

In addition, implementing and embedding the SDGs in university structures is admittedly a complex task, intervention research could yield specifics about how drivers and barriers influence particular features of the implementation (Weiss et. al., 2021b).

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