SUSTAINABILITY COMPETENCIES: A CRITICAL REVIEW

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Abstract
COVID-19 has brought a pause from regularities to make the generation think and make adjustments towards sustainable development. The crisis has reemphasized the need to bring changes in our thoughts, habits and lifestyles. The challenges of sustainable development have emerged on surface through the crisis. The sustainable development requires an overhauling of our thoughts, deeds and personality. The higher education system has a crucial role to play in developing sustainability competencies among future flag bearer. India has always been the promoter for a global cause and common good. It is the duty of our overall education system to imbibe the sustainability competencies in our present citizens to lead a sustainable life.

This study is a comprehensive literature review focussed on sustainability competencies. This paper reviews the various sustainability competencies definitions, key sustainability competencies frameworks and specific key sustainability competencies. The study highlights the various competencies featured in literature by well cited international scholars, and the one recommended by UNESCO.   The study shows that there are numerous views and ideas being discussed in every aspect related to sustainability competencies. However there is no unanimity upon any single view. The definitions changes with the context of geography and subjects.

The study unfolds that there is a lack of discussion about sustainability competencies in the contextual situations of Eastern countries. The specific sustainability competencies under study show that the competencies are being discussed with regards to framework proposition but lack discussions in the context of their attributes and assessments in relation with sustainable development. The specific competency literature is available but in fields other than sustainable development. The study also revealed that some key sustainability competencies are focussed more but others remain neglected. The integrated problem-solving competency can hardly be found discussed in the context of sustainable development. Also the sustainability competencies cannot be discussed in singularity i.e., independent of other competencies.

Introduction
The effect of higher education on the wellbeing of a society cannot be ignored. The Decade of ESD (2005-2014) has made the world to go for a transformation phase where policies are reframed for the educational approaches and outcomes. Quality education and its interconnection with ESD got highly recognised. Quality education doesn't take in account only the formal education provided in schools but also make allowance for lifelong learning for all. It requires practice of life skills at all stages (Leicht et al., 2018). . The importance of integrating perspectives of education for sustainable development with institutions of higher education can easily be explained with the fact that understudies are influenced with the environment they interact with (Chiong et al., 2016). Various approaches for the integration of sustainability to higher education are being tried and tested. UNESCO has also made recommendations and provided guidelines for implementing ESD in educational system at different levels.

However the most recent trend of sustainability approach is the competence based learning. The difficulty in understanding the practical implication of the concept of ESD by most of the educationalists called for adopting it, gave way for the development of a framework based on the competencies requirement (Vare et al., 2019).

Sustainable Development
The developmental sustainability goes with the notion of improving standard of living without causing any disbalance of ecology (Mensah, 2019). The direct or indirect ramifications of technological progress around the globe have advanced different challenges to environment, economic and cultural uniformity. . Living through such complex situations requires individual and

visionary actions. People need to come together, stand up and act towards a positive change (Taimur & Sattar, 2019). These people are termed as 'sustainability citizens'. There is a universal approval of certain key characteristics to be possessed by sustainability citizens for their constructive and responsible act towards complex and uncertain challenges (UNESCO, 2017). With the needs growing day after day and the resources of fulfilment being limited sustainable development is an effort to establish equilibrium between economic growth, ecological integrity and social well-being.

It is a common confusion to use sustainability and sustainable development interchangeably but the two concepts are distinct. In the words of Diesendorf sustainability is the end result of the process of sustainable development (Diesendorf, 2000). In other words, sustainability is a state whereas sustainable development is the means to reach that state (Gray, 2010; Mensah, 2019). The sustainable development builds its success on the success of its three sub domains: economic sustainability, environmental sustainability and social sustainability.

Economic Sustainability: Economic sustainability implies taking decisions in a reasonable and financially impeccable manner in consideration of the other aspects of sustainability (Mensah, 2019).

Environmental Sustainability: The main concept of environmental sustainability focus on the fact that the natural resources be consumed at a slower pace than the ability of the eco system to regenerate and that waste is not disposed at a higher pace than the ability of the ecosystem to absorb (Mensah, 2019) due to the reason that environment has its own limit of maintaining equilibrium.

Social Sustainability: Social sustainability is a combination of subjects such as human rights, gender equity and equality, empowerment, participation, cultural identity, healthcare which all is essential in the promotion of peace and social stability for sustainable development (Gray, 2010).

Sustainability Competencies

With the advent of SDGs the world has started recognising and focussing the major issue of saving and replenishing our only planet. With the efforts of UNESCO a new trend in research has originated to make people aware, all over the globe, the consequences of unthoughtful acts and selfish intentions and to divert them towards adopting of sustainable lifestyle.

Sustainability skills development is a process of mutual dissemination. Such processes of learning are based on society, ability and the probability of aid; hence call for a learning environment offering students to make decisions and bring out solutions for composite environmental issues related to global problems (Barth & Rieckmann, 2012).

Sustainability Competency Framework

Sustainability Competences in the literature is not new but yet there are gaps within the spectrum. There are significant works done by affluent people in assembling and describing key competencies for Sustainability. Within the key competency framework there are some competencies agreed upon by most of the pioneers, however some competencies are debated as for being key competency vs complimentary competencies. Within the agreed upon key competencies yet there are difference of terms used by different experts.

The most cited work done on key competency framework is of Wiek et al., for developing an academic programme. The sustainability competencies highlighted by Wiek et al., are also accepted by UNESCO in its original form. The basic criterion for selection of key sustainability competencies involved in this framework is for preparing students for solving sustainability problems, making them foresee future sustainability challenges and to be well prepared with strategies to handle them as well as creating circumstances leading to a sustainable future (Wiek et al., 2011). However later Redman and Wiek have suggested to include two more competencies namely intra-personal competency and implementation competency in the key sustainability competencies framework. However this suggesting study is yet under review and these suggested competencies are classified as professional skills (Bianchi, 2020).

Recently in the year 2020 Brundiers et al., conducted a Delphi study with 14 members on framework of key Sustainability Competencies while keeping the Wiek et al., 2011 framework as base. Although the six sustainability competencies were agreed upon by all the members yet there was an inclusion of two more competencies as intra personal competency and implementation competency.

Rieckmann (2012) conducted a Delphi study with 70 experts from different countries of Europe and Latin America for defining key sustainability competencies for making higher education

future oriented. The outcome of this study was a set of 19 key competencies which were incorporated in 12 key sustainability competencies. Lans et al., developed a competency framework for sustainable entrepreneurship through literature review, focussed group discussion and structured questionnaire (Lans et al., 2014). Glasser and Hirsh conducted a workshop with 100 participants through which to provide support to the bridging of gap between our zeal to make a sustainable and desirable world and our unsustainable life practices (Glasser & Hirsh, 2016). Quendler and Lamb conducted two questionnaire surveys to make an affiliation between the knowledge, skills and competences provided through higher education institutes and those demanded in the actual companies (Bianchi, 2020).

Dimante et al., did literature review, conducted semi structured interviews and did curriculum analysis of bachelors and masters courses in business and economics field of three higher education institutes to ascertain the competencies required in the field according to circular economy requirements (Brauksa, 2013). Salgado et al., conducted two workshops for an action research study inviting professional practitioners and the facilitators to explore and reflect upon skills required as an effective mediator of social change towards sustainability. The authors identified seven dimensions of intervention competencies starting from their own life experience connecting with their scientific knowledge and the ability to take decisions ending with the collectively made interventions towards sustainability (Perez Salgado et al., 2018).

Lozano et al. made efforts to analyse the connection between the competences for sustainable development and their pedagogical approach in higher education through hermeneutics. In this regard they identified twelve sustainability competencies based on the literature available and four sets of discussion among the authors (Lozano et al., 2017). Eizaguirre et al. used exploratory factor analysis method for determination of sustainability core competencies by considering perspectives of four different stakeholders namely graduates, employers, students and academics from three different continents namely Europe, Latin America and Central Asia more specific for business and management studies (Eizaguirre et al., 2019). Evans used hermeneutics approach and grounded theory method to analyse and synthesize the relevant literature available. The author came up with five sustainability competencies (Evans, 2019).

Dzhengiz and Niesten worked on competencies specifically required for environmental sustainability under their objective of analysing responsible management competences for sustainability (Dzhengiz & Niesten, 2020). In order to develop an assessment procedure for UN SDGs 4.7 challenge Giangrande et al. made some changes to the previously available frameworks for sustainability competencies and advanced to their own framework (Giangrande et al., 2019).

Specific Sustainability Competencies

The Sustainability Competencies Framework is a set of various competencies assembled that are regarded essential to lead a sustainable lifestyle as well as to approach sustainability problems. The Sustainability Competencies mentioned in the UNESCO framework are discussed below.

Systems Thinking Competency

With the mention of Sustainability Competencies the most discussed about competency is the systems thinking competency. The review of literature shows a lot of attributes related with this competency, however, the main attributes of it focusses on the whole and part of a problem, its interrelations, connectedness, modifications and consequences. The most commonly used tool to study this competency is questionnaire/ rating scale and the samples used are higher education students or professionals.
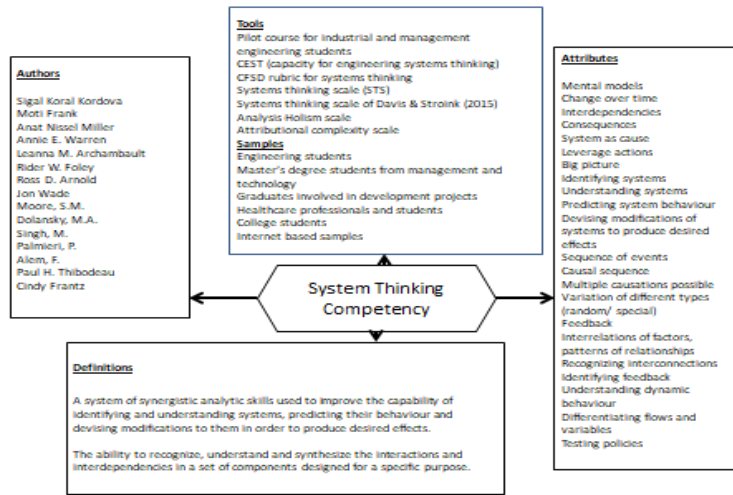
Fig.1 Short literature review of Systems Thinking Competency

Anticipatory Competency

The Anticipatory Competency gains its importance from the fact that unless anticipation of future is done plans and actions cannot be detailed and monitored. The literature shows that the importance of anticipation is discussed throughout Sustainability Competencies but it has not been studied in detail with regards to Sustainability. The literature on Anticipation is available generally in leadership and management field. The attributes from those literatures can be summarised as specificity, relevancy, diversity and transparency.
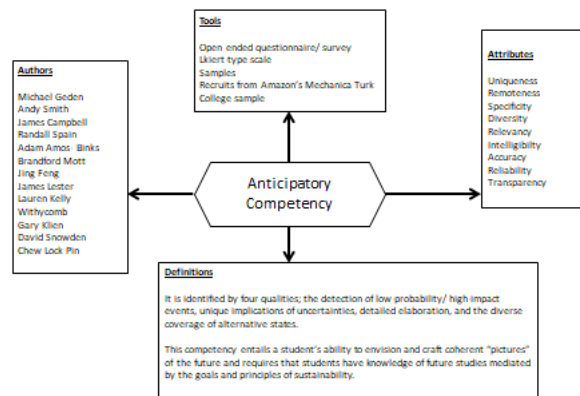

Fig.2 Short literature review of Anticipatory Competency

Normative Competency

Normative Competency is the backbone of Sustainability Competencies. Normative Competency is the reason for sustainability thinking. Sustainability studies have given immense attention towards this competency. The frameworks commonly used for this competency study OECD framework, UNECE framework and UNESCO framework. The attributes summarised can be to personal dimensions, systemic dimensions, critical thinking and transformative actions. The various tools used for this competency include questionnaires and modules developed. The samples are all students.
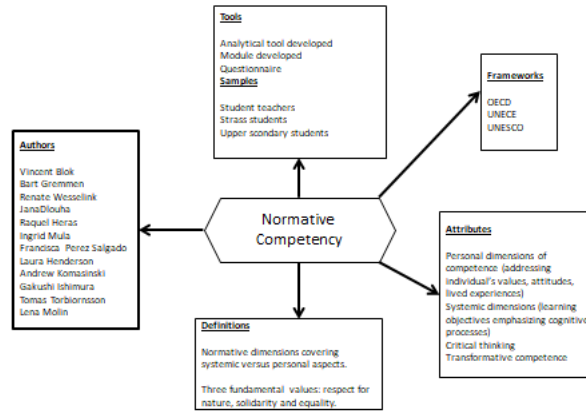
Fig.3 Short literature review of Normative Competency

Strategic Thinking Competency

Strategic Thinking Competency is the need of the hour to tackle the situations of sustainability issues that crop up from time to time due to lack of resources, knowledge, sudden calamities, etc. this competency lack research study with regards to sustainability, the literature available for this competency contributes to the field of management and economics. The attributes can be considered to systems thinking, reflection, reframing and timely thinking. The samples all belong to business and management fields.
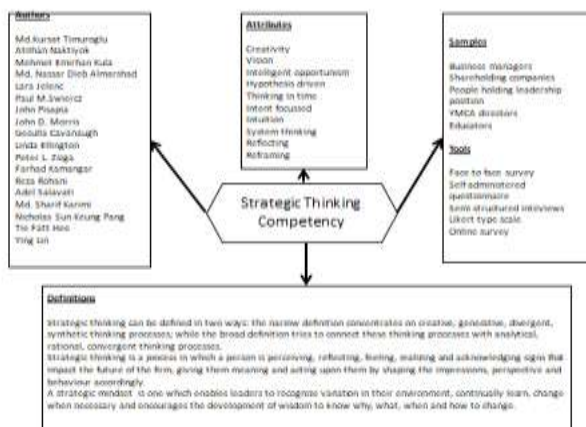

Fig.4 Short literature review of Strategic Thinking Competency

Collaborative Competency

This competency is essential for carrying out sustainability programs smoothly and effectively through team efforts. There is not much literature available for Collaborative competency, however, it goes hand in hand with studies done for its attributes specifically such as interpersonal skills, communication, conflict management, group leadership, etc. The samples used are university students and the tools used are generally questionnaires.
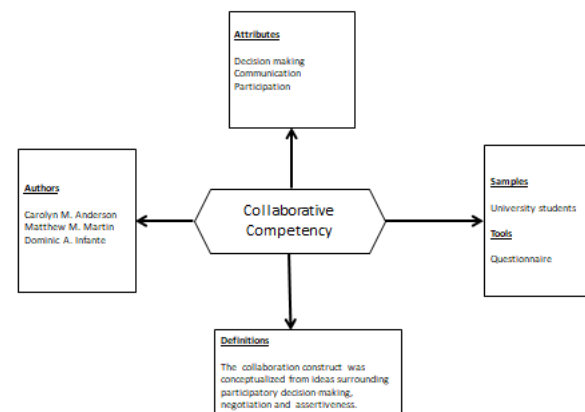

Fig.5 Short literature review of Collaborative Competency

Integrated Problem-Solving Competency

This competency is the summation of all the competencies discussed earlier. It relates to the analysation of use of specific competency at a specific point of time effectively. However this is the most ignored competency in literature. This competency has rarely any study available in the field of sustainability or in any other field to be precise.
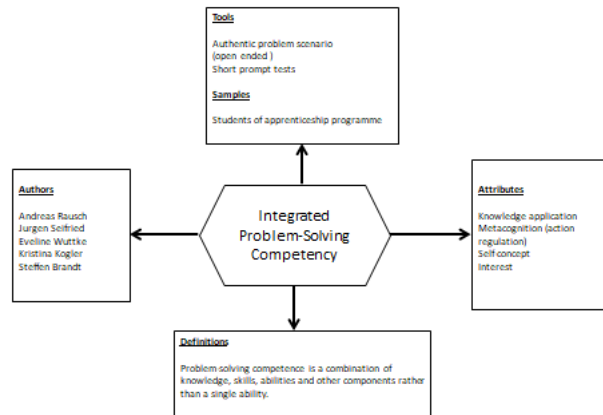

Fig.6 Short literature review of Integrated Problem-Solving Competency

Discussion

The detailed study of individual key sustainability competencies highlights the lack of discussions regarding individual key sustainability competency. There are brain storming sessions for drafting of key sustainability competencies but there is lack of study on specific key competencies as to their sustainability attributes. Systems thinking competency and strategic thinking competency are frequently discussed competencies and normative competency has its demeanor in all frameworks. The competencies have been specified in mostly management related colloquy and need further scrutiny in sustainability. Integrated problem-solving competency being an integration of competencies requires much more focus to interpret in terms of attributes and evaluation. There is also lack of availability of measuring tools for Key sustainability competencies.

The fig.7 shows the attributes derived for application and evaluation of the Key Sustainability Competencies to accord with sustainability programs.
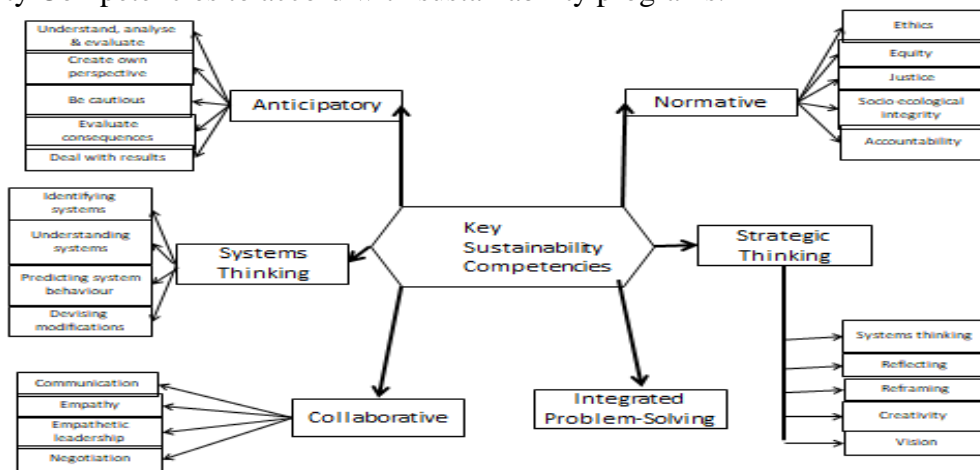

Fig.7 : Derived framework for Key Sustainability Competencies

Conclusion

The intensive literature shows that there is vast array of discussions going on throughout the world to make the planet recover from its current state of depletion. With the UNESCO's intervention and announcement of SDGs a major responsibility has been disposed on the education field and a different field as ESD has been introduced. However there are still discrepancies among experts how to interpret ESD and to integrate it with other fields. With the introduction of ESD many other terms have popped up such as sustainability, sustainability competencies, key sustainability

competencies framework, topical knowledge, discipline competences etc. A major challenge is also faced in defining these terms as there is no single definition accepted by all, rather the definitions of these terms remains ambiguous as they change according to different contexts or circumstances.

The literature review shows that the key sustainability competencies framework proposed by Wiek et al., is majorly followed yet there are framework proposals to different context which cannot be ignored. Even if the key sustainability competencies proposed by Wiek et al., holds uniformity yet the weightage given to each of these individual competencies remain dependent on the course and context it is applied on. There are also no in-depth definitions available of the terms used in ESD or Sustainability Competencies (like definition of discipline competences). Regardless of the disparities the recognition of eight key sustainability competencies' interconnectedness and their application to different contexts cannot be underestimated. Also the interdisciplinary nature of the framework makes it comprehensive and the sustainability competencies are complemented by the basic competences acquired through previous experiences of general schooling as well as specific courses.

The major discussion of the key sustainability competencies discussion gets drifted and the discussion move along with competencies in sustainability rather. Where competencies in sustainability prepares one with living in sustainable lifestyle the key sustainability competencies prepares for a higher level of solving complex problems of sustainability. Another important fact can be reflected upon is that most of the research and discussions about sustainability competencies is carried on by America and Europe; there is a lack of researches along other parts of the world. In order to achieve the sustainable development it is necessary to have researches in other parts of the world too and to include the contextual situations prevalent in Eastern countries.

The Sustainability Competencies literature review shows that there is an urgent requirement of relevant studies in the field. The specific competency review highlight that the various competencies assembled under Sustainability Competencies are not studied through the lens of sustainability. There are some initial studies done with reference to systems thinking competency and normative competency with focus on sustainability but most of the Sustainability Competencies are not studied at all. The Problem-Solving competency hardly has any relevant literature under the framework of sustainability.

There is literature showing the need of certain competencies to be implemented as key Sustainability Competencies but not as showing what and how. The specific competency literature review shows an interconnectedness between the competencies under study for managerial/ leadership skills and sustainability. Yet the present requires studying each Sustainability Competency under its own framework of sustainability. A borrowed competency cannot give its full effect in another context. Hence the review provides illumination to the path of further research work to be undertaken towards each and every Sustainability Competency.

The review of literature also highlights the lack of availability of measuring/ assessing tools for Sustainability Competencies and also the reliability of any such tool available. This area too requires attention of the experts and understudies.

While going through the literature and analysing the attributes of Sustainability Competencies it is also inferred that the Sustainability Competencies cannot be developed focussing on single competency as the competencies are imbibed in each other in such a way that they form a vicious circle of attributes. The development of competencies requires a broader understanding of the interrelation of attributes within each competency.

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