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Development of Sustainability Competencies for the Labour Market: An Exploratory Qualitative Study

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Abstract: The aim of this paper is to explore the key sustainability competencies increasing the employability of higher education graduates in Poland. Based on the results of a broad literature review on key sustainability competencies, the substantive contribution to a coherent framework of typologies of sustainability competencies will be synthesised. The developed research framework will subsequently be analysed with empirical data, collected by in-depth interviews (IDI) and focus group interviews (FGI) on the relevant employability competencies for the Polish labour market. This enables the elimination of critical gaps in the conceptualisation of the key sustainability competencies of higher education (HE) graduates related to the current and future labour market needs. The results of the analysis can make a contribution to sustainable HE graduate employability literature by exploring the links between employability and sustainability competencies. The results may be relevant to institutional support in the design and review of educational programs and training in order to foster sustainability competencies development.

Keywords: sustainability competencies; employability competencies; labour market; higher education graduates; socio-economic challenges

1. Introduction

Sustainable development is considered to be a central model of socio-economic and ecological development at the international level [1,2]. Given the general definition contained in the report of the World Commission on the Environment and Development of the United Nations (UN), the existing sustainability literature includes various interpretations depending on the level of aggregation or scientific discipline [3]. However, the general consensus addresses both the ecological, economic and social dimension as well as the long-term sustainability perspective [4]. The implementation of sustainable development is related to essential changes in the economy and society, given the systemic and integrated interdisciplinary approach [5].

The ongoing efforts at the international level are also the result of achieving the UN Sustainable Development Goals (SDGs) adopted in 2015 with the prospect of 2030 [6]. In the document "Transforming Our World: The 2030 Agenda for Global Action", seventeen key objectives and 169 related tasks were identified. In a strategic view, the SDGs, developed within the broad consensus of the world of business, politics and non-governmental organisations at the international level, provide new development opportunities. One of the seventeen key SDGs is goal No 4 on inclusive and equitable quality education and promoting lifelong learning opportunities for all [6]. The strategic importance of education has been widely recognised, as well as this goal is linked to others outlined in diverse flagship reports of the UN [7]. Education for sustainable development (ESD) and especially the higher education for sustainable development (HESD) are perceived as multidisciplinary areas of research.

These areas gain significance within educational systems around the world, striving for achieving the desired results for graduates [8]. A vital role in the pursuit of sustainable development is played by raising awareness and shaping of pro-ecological and pro-social attitudes through formal (elementary, secondary and academic) and informal (e.g., training, courses) education [9].

Academic institutions are considered to be promoters of changes in business practice supporting the development of entrepreneurship and innovation in the market economy [10]. Therefore, higher education institutions (HEIs) play an important role in ensuring that students, as future decision-makers, are prepared to manage the complex and uncertain problems facing our planet. This requires a specific set of competencies. In literature, largely comparable constructs grouped in five to eight categories related to sustainable development or CSR can be found [11–14]. Competencies such as anticipation, systemic thinking, interdisciplinary approach and participation are regarded as core sustainability competencies developed in higher education [15]. Competencies may be seen as catalysts for building a more critical, innovative and reflective culture that often disputes its own procedures and guiding principles. The knowledge about competencies enabling actors to deal with these complex issues contributes to adapt and change educational programs in HEIs accordingly [15]. This is not only relevant for higher education professionals, but also for companies committed to facing the challenges of sustainable development.

Over recent years, numerous articles and reports have contributed to substantial progress in conceptualising key competencies related to sustainable development [16,17]. Besides this research, an ongoing public debate on competencies that are important for the labour market has also been taking place (e.g., key competencies, general competencies, employability skills), included mainly in reports of different international organisations, e.g., the European Centre for the Development of Vocational Training (CEDEFOP), the European Commission, the Organisation for Economic Co-operation and Development (OECD), the International Labour Organization (ILO) and World Bank reports. However, these discussions are conducted by various researchers using different research methodologies, perspectives and paradigms. In consequence, the existing research reveals a gap in the relevance of sustainability competencies for the labour market [18,19]. While these are precisely specified and investigated in the field of higher education, their application in the labour market context is only described to a limited extent. Most of the published research on competencies in the field of sustainable development is carried out at educational institutions, with particular emphasis on (business) students. It indicates a need for the advanced analysis of sustainability competencies in the work environment [20]. For instance, Ploum et al. [15] highlight that future research should focus on issues related to sustainable entrepreneurship. Lans et al. [12], recommending the revision of research based onfocus groups with sustainable entrepreneurs, have contributed to a more thorough examination of the limits of sustainable entrepreneurship.

Although, in recent years, various studies have contributed to some progress in the conceptualisation of key sustainability competencies, the existing definitions are still at an early stage of development and require further investigation. Further research is needed to identify potential challenges and opportunities for developing sustainability competencies relevant to the labour market. Therefore, this article focuses on two research questions: (1) What types of HE graduates' competencies are considered as key competencies for the labour market both at present and in the future, and (2) to what extent are the present and future competencies related to sustainability competencies? In literature, various studies show that owing to current socio-economic changes (e.g., technological development, globalisation, society ageing), the development of competencies in regard to labour market needs will evolve [21–24]. In line with this, it can be hypothesised that, given the occurring socio-economic challenges, the competencies of higher education graduates needed for the labour market can be considered as conformant with sustainability competencies.

This article aims at exploring the key sustainability competencies enhancing the employability of higher education graduates in Poland. The study will be based on a critical literature analysis and qualitative methods using data collected during in-depth interviews and focus group interviews.

This study will take into account the perspective of the key actors on the labour market having a significant impact on what competencies will be developed at universities.

This article is structured as follows: After the introduction, in Section 2, the literature review on sustainability competencies will be carried out. In Section 3, the research methodology, including the sampling strategy and research methods used will be provided. The following section includes research findings on the Polish labour market needs and the identification of HE graduates' competencies relevant within the context of sustainability competencies. Finally, the discussion and conclusions will be determined along with limitations and future lines of research.

2. Literature Review

Depending on the academic discipline or context, various definitions of competencies can be found. In general, competencies are defined as everything a person knows, understands and is able to do. According to Whiddett and Hollyforde [25], competencies are a set of features of a given person, characteristics such as motivation, personality traits, skills, self-esteem, as well as any knowledge a person has acquired and uses. The concept of competencies, therefore, includes cognitive, motivational, ethical, social and behavioural elements. It integrates certain features, including learning outcomes (e.g., knowledge and skills), systems of values, and other psychological and relational characteristics [26]. This means that knowledge has ceased to be the sole purpose of the educational process, and the cumulative learning outcomes for a given level of education regarding knowledge, skills and personal and social competencies are of great significance [18,27,28]. Competencies comprise knowledge, skills, attitudes and values that enable effective action at work or in another situation [29]. Although competencies are largely focused on the ability to achieve a specific goal, they relate to an "integrated" concept in which knowledge is still important, in conjunction with skills, attitudes and values [30].

Research on the definitions of competencies for sustainable development has been initiated in higher education [28,31,32]. The HEIs have made efforts to integrate the concept of competencies into curricula event though critics suggest that introducing "measurable" competencies has had a negative effect on the–difficult to measure–values inherent to education [33] and sustainability [34]. Although HEIs played a crucial role in determining specific competencies in the field of sustainable development, the results were also criticised as being "laundry lists" [35] and lacking in holistic perspective [34]. Wiek et al. [35] developed a more coherent competency framework of five core competencies referring to sustainability research and problem-solving. These include: Systems-thinking competence, anticipatory competence, normative competence, strategic competence, and interpersonal competence. The framework of Wiek et al. [35] has been consistent with other frameworks proposed in both academic and business contexts [11,36]. This set of competencies was then refined by Osagie et al. [13], Lans et al. [12] and Ploum et al. [15], having regard to the fact that environmental issues and sustainable development at the enterprise level require advanced skills [37]. In order to meet these challenges, in this article, a framework of labour market relevant sustainability competencies will be developed.

Given the current state of the literature, it can be emphasised that different researchers have identified sustainability competencies in the context of work and/or business. In the majority of these studies, a broad or multimode approach to competencies in a business context was used. For instance, Hesselbarth and Schaltegger [11] focus on the contextualisation of competencies in the field of sustainable development in the context of work. Based on the experience of MBA graduates, they propose five core sustainability competencies. Osagie et al. (2016), based on the systematic literature review and results of 28 interviews with CSR managers, compiled eight CSR-related competencies. Wesselink et al. [14] also conducted an empirical study in the field of CRS in order to analyse the competencies of managers involved in corporate sustainable management. They indicated five competencies that reflect the main CSR managers tasks. Moreover, Lans et al. [12] conceptualized seven competencies in the field of sustainable entrepreneurship using focus groups with teachers involved in

entrepreneurship education and exploratory factor analysis. Based on the synthesis of peer-reviewed literature, Table 1 presents a compilation of the key competencies for sustainable development. It is worth noting that the table below not only lists the competencies, but an attempt was also made to conceptualise them based on the definitions of various authors. This is especially relevant for the empirical analysis in this article because researchers on sustainability competencies, labour market practitioners and experts from the academic sector use different terms for similar competencies.

Table 1. Framework of sustainability competencies contextualised in within the context of the labour market.

Key Sustainability Competencies	Conceptualisation	Researchers
1. Systems-thinking competence	• Investigation of complex systems in various scales and fields of inquiry, • Understanding of complex systems phenomena, including core elements and structure, path dependency, • Recognising and comprehension of integration and cause-effect relationship, • Applying qualitative or quantitative modelling, • Dealing with uncertainty, • Developing critical thinking regarding information, knowledge and knowledge construction	Wiek et al. (2011) Hesselbarth and Schaltegger (2014) Lans et al. (2014) Wesselink et al. (2015) Osagie et al. (2016) Ploum et al. (2017) Lozano et al. (2017) Lambrechts and van Petegem (2019)
2. Normative competence	• Understand the norms and values underlining the activities, • Application of concepts of ethics, justice, social and ecological integrity and equity, • Description and negotiation of principles, values, goals and tasks in the field of sustainable development, • Responsibility for taking actions	Wiek et al. (2011) Hesselbarth and Schaltegger (2014) Lans et al. (2014) Ploum et al. (2017) Lozano et al. (2017) Lambrechts and van Petegem (2019)
3. Strategic action competence	• Designing and implementation innovative actions for sustainability, • Development and employment of strategies, • Planning and implementation of projects, • Process management and controlling, • Taking responsibility for motivating others	Wiek et al. (2011) Hesselbarth and Schaltegger (2014) Lans et al. (2014) Wesselink et al. (2015) Osagie et al. (2016) Ploum et al. (2017) Lozano et al. (2017) Lambrechts and van Petegem (2019)
4. Interpersonal competence	• Communication and negotiation skills, • Leadership and collaboration skills, • Dealing with conflicts, • Capacity for empathyRespecting the needs and perspectives of others, • Participation in community processes, • Problem-solving competency	Wiek et al. (2011) Hesselbarth and Schaltegger (2014) Lans et al. (2014) Wesselink et al. (2015) Osagie et al. (2016) Ploum et al. (2017) Lozano et al. (2017) Lambrechts and van Petegem (2019)
5. Diversity and interdisciplinarity competence	• Using knowledge and methods of different disciplines, • Working on complex problems given the interdisciplinary perspective, • Accepting diversity of perspectives, • Intercultural communication skills, • Transcultural understanding,	Lans et al. (2014) Wesselink et al. (2015) Ploum et al. (2017) Lozano et al. (2017) Lambrechts and van Petegem (2019)
6. Foresighted thinking–or anticipatory–competence	• Envisioning of the future, • Analysis and evaluation of future scenarios, • Prediction of reactions, • Assessing the consequences of actions, • Identification and management of potential risks	Wiek et al. (2011) Hesselbarth and Schaltegger (2014) Lans et al. (2014) Osagie et al. (2016) Ploum et al. (2017) Lozano et al. (2017) Lambrechts and van Petegem (2019)

Source: Own study.

In conclusion, it should be emphasised that several competency frameworks for sustainable development can be found in the literature. Nevertheless, the concept of sustainability competencies should be based on a holistic and future-oriented approach, which supports not only decision-making structures but also the critical assessment of opportunities, and commitment to engage and take risks [38]. These competencies combine the need for the ability to cooperate with the understanding of why and how to act to solve current socio-economic and environmental problems.

Assuming that every company or institution can and should be more ecological, there is a need to develop appropriate skills and attitudes. Education covering the sustainability goals and principles allows for acquiring the values, skills and knowledge needed to build a sustainable economy. It enables the generation of an entrepreneurial spirit and preparation of future leaders for solving more complex, interrelated and rapidly changing problems in accordance with the principles of sustainable development. A crucial role in the professional development of sustainability managers is played by the ability to solve problems, analyse complexity and discover more sustainable forms of production and consumption, or the ability to work in a cultural environment on a global scale [8,39]. Moreover, Hull, Kimmel et al. [40] have identified transdisciplinarity and commitment as competencies supporting the development of sustainable development leaders.

3. Materials and Methods

The research aim of the paper is to explore key sustainability competencies that enhance the employability of higher education graduates in Poland. The research analysis will take into account the perspective of the main actors on the labour market having a significant impact on which competencies of graduates will be developed by higher education institutions (HEI) in Poland.

In line with this, the analysis is based on qualitative data collected by using in-depth interviews (IDI) and focus group interviews (FGI). This has allowed for the triangulation of data and improved its validity. The application of IDI as a research technique involves one interviewer and one interviewee. This plays an important role in the moderator's interview, enabling the observation of non-verbal behaviour and focusing the interviewee's attention [41]. This technique works especially in the event of hard-to-reach respondents (as in our case) and when there is a need to deepen the respondent's perspective. IDI will be employed to implement the first research strategy on recognising and understanding the needs of the labour market as regards the employability competencies of graduates from the experts' viewpoint. The second research strategy builds on FGI, which is considered a group technique (one interviewer for around 5 to 12 interviewees). This usually requires less moderator activity (only necessary in certain situations) but more concentration on moderating interactions between interviewees. This technique allows collecting respondent comments resulting from the interaction of the interviewed experts [42].

Interviews were conducted from September to October 2018. In total 18 in-depth interviews and eight focus group interviews were performed with selected interviewees. Representatives of the academic staff participated in the IDI, while the respondents of FGI were employers and HR specialists, academics and other representatives of universities (e.g., specialists from career offices), specialists from labour offices and employment agencies (mixed types of interviewee in each FGI). Both the IDI and the FGI took place in different regions of Poland. The sample was collected in a purposeful manner. Respondents were selected using the following criteria: (1) Representatives of various HEIs from different academic centres in Poland (academic–non-academic, from large cities and peripheries); (2) interest and knowledge about the competencies of university graduates; (3) the balance of the basic characteristics of respondents, such as their age or gender. Table 2 presents an overview of sampling and data collection.

Table 2. Sample characteristics.

Specification	Data Collection Methods	
	IDI (In Total)	**FGI (In Total)**
Type of interviewee	HE institutions representatives from: • public universities: - universities without a specialisation (3), - polytechnics (2), - pedagogical universities (2), - agricultural academies (2), - economics universities (2), - universities for physical education (2), - medical universities (2), - fine arts academies (1) • private high schools (2)	• employers and HR specialists (19), • academics and other representatives of universities (e.g., specialists from career offices) (19), • specialists from labour offices and employment agencies (17)
Cities of research	Kraków (5), Warszawa (4), Poznań (2), Łódź (2), Toruń (1), Wrocław (1), Lublin (1), Gliwice (1), Katowice (1)	Kraków, Toruń, Poznań, Kielce, Warszawa, Gdańsk, Łódź, Wrocław
Number of interviews	18 interviews	8 interviews
Research schedule	September–October 2018	October 2018

Source: Own study.

In order to ensure comparability, interviews were carried out using a discussion guide (or interview scenario). This means that among the topics of the FGIs and IDIs were graduates' key competencies, which should be developed by higher education institutions. Respondents were asked, *inter alia*, to identify those competencies expected to gain in importance over the next five years. The interviews focused chiefly on the labour market needs, however, the interviewee also broadly defined social needs. The IDI and FGI questions were semi-structured. This is a general interview guide approach [42] where the interview is structured by research questions and a flexible scenario. The interviewer spontaneously asks questions in natural interaction with the interviewee; it is the respondent who largely sets the course of the conversation [43]. The interviews began with very broad opening questions and subsequently proceeded to more focused issues. Each FGI lasted between 90 and 120 min, while the IDIs were 45–60 min long. All IDI and FGI interviews were recorded for analytical purposes. All respondents were assured of their anonymity. In order to analyse the research data, the FGIs were fully transcribed and, in the case of IDIs, grids were prepared. In this article, we employ the data collected as part of the interviews on the needs of competencies (both present and future). During the interviews, other issues were raised, such as shortages in competencies of university graduates, education at universities, and the participation of individual universities in projects improving students' competencies. However, due to the defined research objective of this article, these issues were not directly analysed.

Data on competencies' needs was collected in two stages. First, during the IDIs, the interviewees were asked: "Which of the competenciesnu—in their opinion—are currently the most important for employers?" These interviews were conducted in the form of classic brainstorming sessions. The list of competencies indicated by the IDI respondents was then discussed, deepened and supplemented during the FGIs. On this basis, a list of currently important labour market competencies was developed. The investigation of future competencies was carried out in different ways during the IDIs and FGIs. IDI interviewees were simply asked the question: "The significance of which competencies/skills will increase in the next 5 years?" This form of question caused many problems for the respondents. The answers were generalised and moderators attempts to deepen them were ineffective. Therefore, during the FGIs, a different research strategy was implemented. In the beginning, interviewees were asked to identify the most important trends and socio-economic changes to occur in the coming years. After that, the discussion on future competencies was continued.

The data analysis has been divided into many stages, such as data preparation, descriptive examination and explanatory research. After identifying initial types of competencies, a conceptual framework, which grouped detailed competencies into broader (aggregated) categories of a higher order, was developed. This framework was applied to raw data, sorting and synthetised them by theme. In the descriptive phase we set up a competency typology and checked the internal coherence of the categories. Before defining the typology definitively, the following criteria were verified: (1) Mutual exclusiveness of categories, (2) exhaustiveness of grouping of elements, and (3) theoretically meaningful appraisal of categories [44]. This was important to ensure the validity of results. In the final stage based on explanatory research, the competencies identified in the literature review on sustainability competencies were combined with those indicated by the respondents as important at present and in the future.

4. Results

The research analysis will be carried out in two stages. The first step consists of an investigation on which types of competencies are currently considered to be key graduates competencies from the perspective of the Polish labour market. In the second step, the key research question focus on which socio-economic trends affect the competencies of future graduates. This analysis includes the exploration concerning the extent of conformity of the present and future competencies with the sustainability competencies identified in the scientific literature.

4.1. Sustainability Competencies Related to the Current Labour Market Needs

When analysing competency needs from the perspective of the labour market, respondents pointed to a broad conceptual range of graduates' competencies. They defined graduates' competencies that are currently important, including attitudes or dispositions, often using synonyms, such as ability, skill, aptitude or talent. Therefore, it can be concluded that the respondents' statements were usually dominated by a holistic and enumerative approach (respondents calculated sets of features that should be possessed by a university graduate). Considering the definitions of competencies in literature, close to the colloquial (identified during research) understanding of this concept is the definition of Whiddett and Hollyforde [25], identifying as elements of competence not only its classic components but also the dispositions of individuals or personal characteristics.

Based on the competencies definitions, it was possible to determine which competencies are currently relevant from the perspective of the labour market, as well as which of these, according to the respondents, can and should be developed by universities. The results of the analysis show that a relatively coherent picture of competence needs emerges between respondents, which can generally be divided into two groups:

(1) Basic skills—understood as general competencies (not only of cognitive nature) necessary to perform simple work and acquire new skills. These competencies are associated with the basic needs of employers, which seem stable over time. Apart from professional competencies, respondents indicated that employers want their employees to: Have potential (e.g., appropriate cognitive competencies), have the general competencies necessary to perform their work (e.g., be able to communicate clearly in speech and in writing in their native language and/or a foreign language), not to have problems in relations with other people (clients, colleagues, supervisors), be well organised and exhibit a positive attitude at work (e.g., active, not passive). This can be illustrated by the following statement: *"... certainly, self-organisation of work, searching and analysing information and drawing conclusions (...), the ability to think slightly abstractly and cause-and-effect"* (participant of FGI No 3, Kielce). Generally, these competencies should be developed, to a large extent, in the family environment, as well as in compulsory education;

(2) Professional competencies–often equated to higher-order skills or even talent. This type of competence is particularly important not only in the context of professional work but also in relation to the concept of sustainability. Interestingly, in the case of professional graduates'

competencies, assessed as currently important for performing professional work, respondents indicated skills that are only partially consistent with the theoretical concept of sustainability competencies. As an example, the following interview quotation can be given here: *"I think what is really important, if we want to keep the company on the market, is authentic leadership (...). If there is no leader with very highly developed social competencies, then specialists will leave. Because we said here that people work for a sense of meaning and identify strongly with the company"* (participant of FGI No 4, Kraków).

It should be emphasised that the interviewer intentionally asked a question about competency needs assuming no response support to reduce the risk of suggesting answers as a result of the leading question [45,46]. This probably resulted in a narrow view of the current needs of the labour market. Based on these preliminary studies on the importance of general competencies for the market, it can be concluded that the analysis shows a certain convergence between sustainability competencies and employability competencies only in the case of three out of six sustainability competencies, i.e.:

- Strategic action competencies—for this group of competencies, the convergence of respondents' answers was the highest. Respondents emphasised the importance of the following skills: Strategic thinking, anticipating consequences, pursuing a goal, completing a task, creativity, innovation, flexibility as adaptation to changing conditions, diligence, accuracy and full completion of tasks, stress resistance, self-organisation of work (time management, work planning, prioritising), independence, initiative, self-discipline. The interview respondents offered the following comment on that point: *"Resistance to failure, this is a huge deficit in this young generation - they give up and, if they fail, they don't make another attempt"* (participant of FGI No 5, Łódź). An another respondent suggested e.g.: *"Taking the initiative and entrepreneurship will be more and more important"* (participant of FGI No 3, Kielce).
- Interpersonal competencies—experts pointed to: Communication skills, interpersonal contacts (including group cooperation, teamwork), openness (willingness to understand the perspective of others, empathy) as well as influence, persuasion and assertiveness. This is reflected in the quotation of one of the respondents: *"For me, cooperation with people from other nationalities is very important—this is something that I think we need to learn all the time because these cultural differences they simply exist"* (participant of FGI No 7, Warszawa).
- Systems-thinking competencies—in this case, experts emphasise the importance of: Information selection skills (search, synthesis, the ability to generalise). For instance, one of the respondents pointed out that: *"Even if he has no knowledge on a topic or area, he is often able to simply acquire it, because there are a lot of sources available at the moment (...). You need to be able to screen out information that is unreliable"* (participant of FGI No 5, Łódź).

Based on this results, it can be concluded that the perception of the current labour market in Poland by respondents indicates a market orientation (in a narrow sense) rooted in thinking derived from the knowledge-based economy and human capital theory (HCT) paradigm [45,46] rather than concepts related to sustainable development. Moreover, the results of the analysis showed that labour market experts are often unaware that graduates' employability competencies can also contribute to key sustainability competencies. This may result either from a lack of knowledge on the topic of sustainable development or from the short-term labour market needs. Although the experts have frequently referred to the sustainability competencies (e.g., problem-solving, diversity), they defined them in a narrow way that relates only to the needs of employers (the perspective "for"). The wider perspective of looking at the needs of the labour market, as characteristic of the sustainability approach, occurred with a much lower incidence. This shows that respondents use different perspectives to determine labour market needs. Although these perspectives are perceived to be consistent, they are described by different terms.

4.2. Sustainability Competencies Related to the Future Labour Market Needs

In the second stage of the study, another research strategy based on FGIs was used. This approach led to different results than the first step. In this case, respondents were asked about how competencies needs will change over the next five years and the importance of which graduate competencies are likely to increase. To consolidate the creativity of respondents and to deepen the issue, the first question about key trends and socio-economic changes likely to appear on the Polish labour market in the future (five to ten years perspective) was asked. The respondents listed the following drivers: Technological development (process/production automation, digitisation, information technologies and artificial intelligence), globalisation and its related multiculturalism, population ageing, increase of interdisciplinarity and interpenetration of professional sectors/tasks, change of employment forms and work models (project work, remote/mobile work, freelancing, frequent career changes, changes in organisational structures, platform work), changes in value and other issues perceived as being important at work. This is exemplified by the statements of FGI participants (Table 3).

Table 3. Sample statements of respondents regarding the most important socio-economic challenges.

Main Socio-Economic Challenges	Representative Statements of Respondents
Technological development	• "One of the professions that appears just in response to the rapid growth of IT—I don't remember the English name, but it would be something like IT ethics or ethics of artificial intelligence, which will be able to implement non-algorithmic choices" (participant of FGI No 5, Łódź). • "Another such trend is definitely the automation of both production and processes in the sense of using algorithms and work on large data sets. This is already happening a bit, but it will definitely progress" (participant of FGI No 4, Kraków). • "I am a little afraid whether the development of technology and the transition to communicators (short information) will make it easier for me to get along in a practical situation face to face or in a group. If I am now accustomed to Twitter 140 characters (...) and such very consumer information, the question arises whether I can solve a complex problem, where I will suddenly have to confront many people and their points of view" (participant of FGI No 5, Łódź). • "The ability to solve problems in connection with automation, correcting errors, because the machine repeats, but does not necessarily correct, adding some functionality, searching, it will be something that will be needed more" (participant of FGI No 4, Krakow).
Globalisation and multiculturalism	• "If we are talking about a ten-year perspective, then (...) we will be able to import employees from the Far East who are culturally very different from us. We haven't experienced this. If we do not have the multicultural experience, this is just ahead of us, but as a society, we are absolutely unprepared for it" (participant of FGI No 6, Poznań).
Ageing population	• "Demographics are changing. Even for our region, they are very unfavourable because of the ageing population" (participant of FGI No 5 Łódź).
Increase in interdisciplinarity of fields and penetration of industries/ professions	• "Interdisciplinarity, different views that will give a synergy effect and added value to the project" (participant of FGI No 5, Łódź). • "I would add cooperation with people of different nationalities because more and more corporations operate on the basis of remote teams and I know that there are a lot of cultural problems here" (participant of FGI No 5, Łódź).
Change of employment form and work models	• "Coping with the situation of diversity, all kinds of diversity, because since we say that [graduates] will work on projects, then the people and places and tasks and tools that we work with will change" (participant of FGI No 6, Poznań), • "I would add that the work model will change. The next generation will enter the labour market, Generation Z. I think that here, a greater flexibility of employers will be needed (...), there will definitely be more freelancers" (participant of FGI No 4, Krakow).
Changing values and other issues seen as important at work	• "Now, young people looking for a job want to know: Is the job people-friendly, is there no mobbing, are people nice to one another (...) or is there no exploitation of employees. Because they want to have time for their hobbies, for their pleasures, for spending time with family. They just want to live" (participant of FGI No 7, Warszawa). • "Desired traits and attitudes—decision-making and a sense of responsibility can be indicated here (...) Courage in making decisions and challenges, a sense of responsibility for what I do, who I am, and so on (...), own initiative—taking the initiative (...) and a creative approach to tasks" (participant of FGI No 6, Poznań).

Source: Own study.

Based on the identified drivers, respondents prepared a list of graduates' competencies that can increase in importance over the next five years. This list is only partially consistent with the competencies defined as being currently important for the labour market, indicated in the first research stage. Owing to this research strategy, the list of graduates' competencies has been expanded significantly.

Subsequently, the comparison and assessment on the conformity of the present and future competencies with the theoretical sustainability competencies, identified in the scientific literature, were made. The presented synthesis of research results shows that each of the sustainability competencies was reflected in the detailed competencies indicated by respondents as future skills. It should be added that the future competencies identified in the study are largely consistent with sustainability competencies. In particular, three competencies often coincided with the future needs of the labour market. These are: Interpersonal competence, normative competence, as well as diversity and interdisciplinarity competence, reflecting a number of future challenges.

Given the research results, it should be emphasised that the demand for sustainability competencies is related to the most important socio-economic processes, i.e. technological development, globalisation and changes to the working environment and forms of employment. The list of identified future competencies and their relationship with drivers and sustainability competencies is presented in Table 4.

Table 4. Conformity between future competencies and sustainability competencies.

Trends in the Economy/Labour Market *(Respondents' Suggestions)*	**Future Competencies** *(Respondents' Suggestions)*	**Sustainability Competencies** *(Based on the Literature Review)*
• Technological development (process/ production automation, digitisation, information technologies and artificial intelligence)	• Problem-solving skills • Ability to search for information and work on large data sets • Error correction • Digital and analytical competencies • Ethical use of new technologies and anticipating effects • Interdisciplinarity	• Systems-thinking competence • Normative competence • Diversity and interdisciplinarity competence • Foresighted thinking–or anticipatory–competence
• Globalisation and multiculturalism	• Openness • Intercultural communication • Knowledge of the principles/behaviour of other cultures	• Interpersonal competence • diversity and interdisciplinarity competence
• Population ageing	• Empathy • Openness • Communication • People-to-people contacts	• Normative competence • Interpersonal competence
• Increased interdisciplinarity, interpenetration of industries/professions	• Learning ability • Creativity, flexibility • Interdisciplinary • Openness to new things/tasks	• Systems-thinking competence • Strategic action competence • Diversity and interdisciplinarity competence
Change of employment forms: • project work, • teleworking/mobile working, • freelancing, • frequent changes in career, • changes in organisational structures, • work without belonging to one company (employee outsourcing),	• Flexibility • Willingness to change/adapt • Self-organisation of work • Self-discipline • Timeliness • Task orientation • Interdisciplinarity • Resistance to stress • Functioning in a situation of change • Coping with situations of diversity (place and time of work, tasks, colleagues) • Mobility • Learning ability	• Normative competence • Strategic action competence • Interpersonal competence • Diversity and interdisciplinarity competence
• Changing values and other issues seen as important at work	• Coaching skills (people management) • Leadership competence • Authentic leadership	• Normative competence • Interpersonal competence

Source: Own study.

Finally, it should be emphasised that the empirical analysis shows that the sustainability competencies can be shaped by taking into consideration the perspective of socio-economic challenges. The research findings contribute to the development of a constructive framework for sustainability competencies. This covers key competencies enabling people to promote sustainable development.

5. Discussion and Conclusions

The overarching objective of this study was to explore key sustainability competencies that are simultaneously relevant to the labour market regarding the employability of HE graduates. The studywas based on the qualitative research considering the perspective of the main actors on the labour market having a significant impact on what kind of competencies will be developed at polish universities. This study allows answering the following research questions: (1) What types of HE graduates' competencies are considered to be key competencies for the labour market both at present and in the future, and (2) to what extent are the present and future competencies related to the sustainability competencies?

Based on the literature review, there is a broad range of sustainability competencies, however, their practical use for the labour market must be supported. The research findings highlight substantial potential for combining the concept of graduate employability with the concept of sustainability competencies. The empirical results support the initially formulated thesis that the employability competencies of higher education graduates, which are dependent on occurring socio-economic challenges, can be considered as conformant with the sustainability competencies for the labour market. However, the research indicates that there are different dependencies between employability and sustainability competencies from the perspective of labour market experts in Poland. Therefore, this exploratory analysis distinguished between sustainability competencies related to both the current and future labour market needs.

Given this research design, the paper contributes to the field of conceptualising sustainability competencies in many ways. Firstly, it examines different typologies of key sustainability competencies important for the employability of graduates. Thus, a framework of six competencies based on the synthesis of peer-reviewed literature has been conceptualised. This was important for the empirical analysis because sustainability competencies researchers, labour market practitioners and experts from the academic sector use different terms for similar competencies. This synthesis provides valuable insights into the fostering of sustainability competencies by identifying diverse attributes that have been developed in recent years.

Secondly, the empirical analysis explores sustainability competencies based on two research strategies employing the triangulation of data and research methods. Owing to the first strategy, the researcher was able to identify the graduates' basic and professional competencies that are important for the labour market at present. The results show that the respondents' perspective indicates a market-focused orientation (in a narrow sense) rooted in thinking related to the knowledge-based economy and human capital theory paradigm [45,47] rather than to holistic approach of sustainable development. It demonstrates a short-term perspective of the labour market needs. Subsequently, using the second research strategy, the current competencies were verified and enhanced based on focus groups with labour market experts and HEI representatives. By identifying socio-economic challenges related to the future labour market needs in Poland, respondents emphasise the importance of future graduate employability competencies that may relate to key sustainability competencies. It should be underlined that current discussions, conducted by practitioners and researchers on the graduates'competencies, take place separately [41], without the sustainability perspective, which requires a broader view on the current labour market needs. When examining the skills clearly needed on the labour market, the employability perspective is often adopted (i.e. how to teach students to find a good job). On the one hand, this means that competencies are adapted to the current labour market requirements (the "for" approach). On the other hand, taking the sustainability perspective into account allows for a broader analysis of future-oriented labour market needs (i.e. how to teach

graduates to change the labour market) in order to shape specific labour market needs (the "in order to" approach), and not just adapt to the needs of the labour market. It shows two different perspectives constituting the subject of the empirical analysis in this article. Our findings extend significant the recent streams of graduates' sustainable employability competencies [31,48,49] by analysing the sustainability competencies for the labour market based on the socio-economic challenges.

Finally, the study results contribute to explain how sustainability competencies, relevant to the labour market needs, should be developed. It can be stated that the shaping of sustainability competencies can be supported by changing the perspective from a short-term viewpoint to a long-term outlook. Owing to this, the socio-economic drivers were identified, and specific competencies of the future were subsequently determined. Among the major socio-economic challenges, six areas have been identified that have an impact on the labour market needs. These include: (1) Technological development (e.g., process/production automation, digitisation, information technologies and AI), (2) globalisation and multiculturalism, (3) population ageing, (4) an increase in the interdisciplinarity of fields, interpenetration of industries/professions, (5) change of employment forms and work models (project work, remote/mobile work, freelancing, frequent changes of career/work, changes in organisational structures, work without belonging to one company), (6) changes of values and other important work issues. Given these challenges, this study extends the existing literature on sustainability competencies by stressing the significance of socio-economic drivers in shaping employability competencies for HE graduates. Furthemore, the study demonstrates broader perspective than the other researchers inquiry that indicated an important role only of selected drivers of sustainability competencies, e.g., globalisation and technological development [50–53].

In conclusion, it can be highlighted that the concept of sustainability competencies should be based on a holistic and future-oriented approach. These competencies combine the need for the ability to cooperate with an understanding of why and how to act to solve current socio-economic and environmental problems. Based on the empirical results, it should be stressed that they make contribution to the emerging literature on sustainability competencies by an exploratory in-depth research approach on what kind of competencies should be enhanced and how to developed them? This study was explicitly focused on identifying the main socio-economic drivers that affect the development of the sustainability competencies which is a new approach compared to previous research by including a broad analysis both on current and future competencies to meet occurring socio-economic challenges.

Furthermore, this research provides practical implications both for HE and for labour market experts. The HE graduates' skills important for the labour market should be developed with greater regard to the concept of sustainable development. It seems that HEIs can play a vital role in shaping competencies both for sustainability development and for future careers of graduates. However, more attention should be given to the ethical and motivational issues in the education process, because professional skills will contribute to sustainable development only in conjunction with willingness to act. These competencies are likely to be developed as part of formal or informal education because they will be important for career development. The implementing of the sustainability concept on the labour market requires not only basic and professional competencies but also specific values that can support these skills. It should be noted that, just as employability competencies do not automatically convert into economic growth [54], also competencies conducive to sustainability will not always make the development sustainable. Achieving a sustainable future requires from those employed in the labour market to have different values, attitudes, skills, habits and behaviours [49]. This is largely related to the change in consciousness and constitutes the basis for further actions by supporting personality development to be able to deal with complex situations and make appropriate decisions, take responsibility, and act in line with the sustainable development.

Moreover, there is a need for the reinforcing and prevalence of sustainability competencies in Polish debate on employability competencies because labour market experts are often unaware of sustainability challenges. This issue is related to the parallel debate on employability competencies

and sustainability competencies for HE graduates. These discussions are conducted by different experts and researchers. In line with this, it seems that common ground for research should be sought. These studies could concern, for example, the relationship between sustainability and employability competencies. Both areas should draw on their own experience. For example, by comparing the typology of employability and sustainability competencies, it is possible to expand the classification of sustainability competencies by a personal dimension, including psychological competencies. The relevance of personal competencies in the context of sustainable development was highlighted e.g., by Livina et al. [55] and Valickas et al. [56]. The need for these competencies results from the fact that they are particularly important in the era of increasing uncertainty and the complexity of socio-professional reality.

Despite the effort put into designing the research, this study indicates some limitations. A common limitation in the qualitative study derives from the convenience sampling method which relies on data collection from members of the population who were available to participate in the study. Therefore the contribution of this paper to the research field is moderate owing to a qualitative approach. Due to the under-representation of the sample, the research results have a limited possibilities to be generalised to the target population or the other social and cultural contexts. However, the preliminary results can be utilised for more advanced analysis in the future. Moreover, it might be relevant to analyse selected governmental measures needed for the evaluation and development of sustainable competencies in Poland. Future research should also take into consideration other data sources to perform a comparative analysis. This research concerns the current labour market needs and identification of future skills relevant in the context of sustainability competencies. However, given the growing importance of sustainability, changes in the work environment can be also observed in other countries. Therefore, further research should involve conducting a geographical comparison with alternative countries and analysing whether the obtained findings can be extrapolated to various economic, social and cultural contexts.

Due to social and environmental challenges on a global scale, sustainable development is a complex model that cannot be attributed to one discipline [57]. Therefore, an interdisciplinary approach to research in sustainable development is required. This means that economics methodology should use a variety of disciplines and methods to describe and explain scientific facts [5,58], including labour market needs and the HE graduates' perspective. Therefore, further research should be focused on methods of stimulating the development of sustainability competencies related to the social and environmental issues. Assuming that each company or institution can and should be more ecological, there is also a need to develop appropriate skills and attitudes needed to prepare future leaders for solving more complex, interrelated and rapidly changing problems. For instance, El-Zein and Hedemann [59] argue that the focus on problem-solving in the (higher) engineering education influences the profession's attempt at maintaining importance in the era of sustainability.

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References

1. Redclift, M. Sustainable development (1987–2005)—An oxymoron comes of age. *Sustain. Dev.* **2005**, *13*, 212–227. [CrossRef]
2. Lockley, J.; Jarrath, M. The Nature of Sustainability as Viewed by European Students. *J. Educ. Sustain. Dev.* **2013**, *7*, 113–124. [CrossRef]

3. Johnston, P.; Everard, M.; Santillo, D.; Robert, K. Reclaiming the definition of sustainability. *Environ. Sci. Pollut. Res.* **2007**, *14*, 60–66. [CrossRef]
4. WCED. *Our Common Future*; Oxford University Press: Oxford, UK, 1987.
5. Urbaniec, M. Measuring and monitoring effects of sustainable development in the European Union. *Eur. J. Sustain. Dev.* **2016**, *5*, 1–17. [CrossRef]
6. UN. *Transforming Our World: The 2030 Agenda for Sustainable Development*; United Nations: New York, NY, USA, 2015.
7. Vladimirova, K.; Le Blanc, D. *How Well Are the Links between Education and Other Sustainable Development Goals Covered in UN Flagship Reports? A Contribution to the Study of the Science-Policy Interface on Education in the UN System*; Department of Economic and Social Affairs (DESA): New York, NY, USA, 2015.
8. UNESCO. Education for Sustainable Development. Available online: https://en.unesco.org/themes/education-sustainable-development (accessed on 31 July 2019).
9. EC. *Europe 2020. A Strategy for Smart, Sustainable and Inclusive Growth, COM(2010) 2020*; European Commission: Brussels, Belgium, 2010.
10. Jamali, D.A. Opportunities and challenges for CSR mainstreaming in business schools. *Int. J. Technol. Educ. Mark.* **2016**, *6*, 1–29. [CrossRef]
11. Hesselbarth, C.; Schaltegger, S. Educating change agents for sustainability–learnings from the first sustainability management master of business administration. *J. Clean. Prod.* **2014**, *62*, 24–36. [CrossRef]
12. Lans, T.; Blok, V.; Wesselink, R. Learning apart and together: Towards an integrated competence framework for sustainable entrepreneurship in higher education. *J. Clean. Prod.* **2014**, *62*, 37–47. [CrossRef]
13. Osagie, E.R.; Wesselink, R.; Blok, V.; Lans, T.; Mulder, M. Individual competencies for corporate social responsibility: A literature and practice perspective. *J. Bus. Ethics* **2016**, *135*, 233–252. [CrossRef]
14. Wesselink, R.; Blok, V.; van Leur, S.; Lans, T.; Dentoni, D. Individual competencies for managers engaged in corporate sustainable management practices. *J. Clean. Prod.* **2015**, *106*, 497–506. [CrossRef]
15. Ploum, L.; Blok, V.; Lans, T.; Omta, O. Toward a validated competence framework for sustainable entrepreneurship. *Organ. Environ.* **2017**, *31*, 113–132. [CrossRef]
16. Segalas, J.; Ferrer-Balas, D.; Svanstrom, M.; Lundqvist, U.; Mulder, K.F. What has to be learnt for sustainability? A comparison of bachelor engineering education competencies at three European universities. *Sustain. Sci.* **2009**, *4*, 17–27. [CrossRef]
17. Willard, M.; Wiedmeyer, C.; Flint, R.W.; Weedon, J.S.; Woodward, R.; Feldman, I.; Edwards, M. *The Sustainability Professional: 2010 Competency Survey Report*; International Society of Sustainability Professionals (ISSP): Portland, Oregon, 2010.
18. Sanchez, J. The impact of an entrepreneurship education program on entrepreneurial competencies and intention. *J. Small Bus. Manag.* **2013**, *51*, 447–465. [CrossRef]
19. Roorda, N.; Rachelson, A. *The Seven Competences of the Sustainable Professional: Developing Best Practice in a Work Setting*, 1st ed.; Routledge: London, UK, 2018; p. 1.
20. Lambrechts, W.; Gelderman, C.J.; Semeijn, J.; Verhoeven, E. The role of individual sustainability competences in eco-design building projects. *J. Clean. Prod.* **2019**, *208*, 1631–1641. [CrossRef]
21. MacCrory, F.; Westerman, G.; Alhammadi, Y.; Brynjolfsson, E. Racing with and against the machine: Changes in occupational skill composition in an Era of rapid technological advance. In Proceedings of the Thirty Fifth International Conference on Information Systems: Building a Better World through Information Systems, Auckland, New Zealand, 14–17 December 2014; AIS/ICIS Administrative Office: Atlanta, Georgia.
22. Mangelsdorf, M. The New World of Work. *Mit Sloan Manag. Rev.* **2015**, *56*, 96.
23. OECD. *Skills for Jobs*; OECD Publishing: Paris, France, 2018.
24. Smith, C. Skill demands and the developments in the advanced economies. In *The Oxford Handbook of Skills and Training*; Warhurst, C., Mayhew, K., Buchanan, J., Eds.; Oxford University Press: Oxford, UK, 2017; pp. 491–508.
25. Whiddett, S.; Hollyforde, S. *The Competencies Handbook*; Jaico Publishing House: Mumbai, India, 2008.
26. Prandi, M.; Martell, J.; Lozano, J.M. Learning in a Social Context. Available online: http://www.unprme.org/resource-docs/LearninginaSocialContextReport.pdf (accessed on 17 August 2019).
27. Fayolle, A.; Kyrèo, P. *The Dynamics Between Entrepreneurship, Environment and Education*; Edward Elgar: Cheltenham, UK; Northampton, MA, USA, 2008.

28. Rieckmann, M. Future-oriented higher education: Which key competencies should be fostered through university teaching and learning? *Futures* **2012**, *44*, 127–135. [CrossRef]
29. Delamare Le Deist, F.; Winterton, J. What is competence? *Hum. Resour. Dev. Int.* **2005**, *8*, 27–46. [CrossRef]
30. Mulder, M. Conceptions of professional competence. In *International Handbook of Research in Professional and Practice-based Learning*; Billett, S., Harteis, C., Gruber, H., Eds.; Springer Netherlands: Dordrecht, The Netherlands, 2014; pp. 107–137.
31. Barth, M.; Godemann, J.; Rieckmann, M.; Stoltenberg, U. Developing key competencies for sustainable development in higher education. *Int. J. Sustain. High. Educ.* **2007**, *8*, 416–430. [CrossRef]
32. Rowe, D. Education for a sustainable future. *Science* **2007**, *317*, 323–324. [CrossRef]
33. Cheetham, G.; Chivers, G. ChiversTowards a holistic model of professional competence. *J. Eur. Ind. Train.* **1996**, *20*, 20–30. [CrossRef]
34. Lambrechts, W.; van Petegem, P. The interrelations between competences for sustainable development and research competences. *Int. J. Sustain. High. Educ.* **2016**, *17*, 776–795. [CrossRef]
35. Wiek, A.; Withycombe, L.; Redman, C.L. Key competencies in sustainability: A reference framework for academic program development. *Sustain. Sci.* **2011**, *6*, 203–218. [CrossRef]
36. Brundiers, K.; Wiek, A. Beyond Interpersonal Competence: Teaching and Learning Professional Skills in Sustainability. *Educ. Sci.* **2017**, *7*, 39. [CrossRef]
37. Hall, J.; Daneke, G.; Lenox, M. Sustainable development and entrepreneurship: Past contributions and future directions. *J. Bus. Ventur.* **2010**, *25*, 439–448. [CrossRef]
38. Kapitulčinová, D.; Dlouhá, J.; Ryan, A.; Dlouhý, J.; Barton, A.; Mader, M.; Tilbury, D.; Mula, I.; Benayas, J.; Alba, D.; et al. (Eds.) *Leading Practice Publication: Professional development of university educators on Education for Sustainable Development in European Countries*; Charles University: Prague, Czechia, 2015.
39. UNESCO. *Education for Sustainable Development Goals: Learning Objectives*; UNESCO: Paris, France, 2017.
40. Hull, R.B.; Kimmel, C.; Robertson, D.P.; Mortimer, M. International field experiences promote professional development for sustainability leaders. *Int. J. Sustain. High. Educ.* **2016**, *17*, 86–104. [CrossRef]
41. Patton, M.Q. *Qualitative Research and Evaluation Methods*, 4th ed.; Sage Publications: London, UK, 2015.
42. Silverman, D. *Doing Qualitative Research: A Practical Handbook*; Sage Publications: London, UK, 2005.
43. Cope, J. Entrepreneurial learning from failure: An interpretative phenomenological analysis. *J. Bus. Ventur.* **2011**, *26*, 604–623. [CrossRef]
44. Berg, B.L. *Qualitative Research Methodds for the Social Sciences*; Allin and Bacon: Boston, MA, USA, 2001.
45. Becker, G.S. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*; The University of Chicago Press: Chicago, IL, USA, 1994.
46. Schultz, T.W. *Investment in Human Capital: The Role of Education and of Research*; Collier-Macmillan: New York, NY, USA, 1971.
47. van Deursen, A.; Helsper, E.J. The third-level digital divide: Who benefits most from being online? In *Communication and Information Technologies Annual: Digital Distinctions and Inequalities*; Robinson, L., Cotten, S.R., Schulz, J., Hale, T.M., Williams, A., Eds.; Emerald Group Publishing Limited: Bingley, UK, 2015; Volume 10, pp. 29–52.
48. Tymon, A.; Harrison, C.; Batistic, S. Sustainable graduate employability: An evaluation of 'brand me' presentations as a method for developing self-confidence. *Stud. High. Educ.* **2019**. [CrossRef]
49. Clarke, M. Rethinking graduate employability: The role of capital, individual attributes and context. *Stud. High. Educ.* **2018**, *43*, 1923–1937. [CrossRef]
50. Jandric, M.; Randelovic, S. Adaptability of the workforce in Europe—changing skills in the digital era. *Zbornik radova Ekonomskog fakulteta u Rijeci: časopis za ekonomsku teoriju i praksu.* **2018**, *36*, 757–776. [CrossRef]
51. Alexankov, A.M.; Trostinskaya, I.R.; Pokrovskaia, N.N.; Ardashkin, I.B.; Martyushev, N.V.; Klyagin, S.V.; Barkova, E.V.; Massalimova, A.R.; Syrov, V.N. Industry 4.0: Requirements for Quality of Human Capital and Competences Formed within Educational Institutions. In Proceedings of the International Conference on Research Paradigms Transformation in Social Sciences (Rptss 2017), Irkutsk, Russia, 18–21 May 2017; Volume 35, pp. 26–34. [CrossRef]
52. Ismail, A.; Kasman, Z.; Sumarwati, S.; Yunus, F.A.N.; Abd Samad, N. The development of job competency for skilled technical worker towards green technology. *Int. J. Geomate* **2019**, *17*, 216–221. [CrossRef]
53. Gotesman Bercovici, E.; Bercovici, A.; Sandru, M. Effects of the Fourth Industrial Revolution on the Israeli Economy. *Qual. Access Success* **2019**, *20*, 61–66.

54. OECD. *Better Skills, Better Jobs, Better Lives: A Strategic Approach to Skill Policies*; OECD Publishing: Paris, France, 2012.
55. Livina, A.; Rozentale, S.; Brigsa, S.; Andersons, A.; Kreituze, I.; Auzina, A. Personal competencies for future labour market in Vidzeme region, Latvia. In Proceedings of the Economic Science For Rural Development: Integrated and Sustainable Regional Development, Production and Co-Operation in Agriculture, Jelgava, Latvia, 21–22 April 2016; pp. 107–113.
56. Valickas, A.; Raisiene, A.; Rapuano, V. Planned happenstance skills as personal resources for students' psychological wellbeing and academic adjustment. *Sustainability* **2019**, *11*, 3401. [CrossRef]
57. Spaiser, V.; Ranganathan, S.; Swain, R.B.; Sumpter, D.J.T. The sustainable development oxymoron: Quantifying and modelling the incompatibility of sustainable development goals. *Int. J. Sustain. Dev. World Ecol.* **2016**, *24*, 457–470. [CrossRef]
58. Patzelt, H.; Shepherd, D. Recognizing Opportunities for Sustainable Development. *Entrep. Theory Pract.* **2011**, *35*, 631–652. [CrossRef]
59. El-Zein, A.H.; Hedemann, C. Beyond problem solving: Engineering and the public good in the 21st century. *J. Clean. Prod.* **2016**, *137*, 692–700. [CrossRef]