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Continuing Education Measures for the Development of Future Skills at Universities:
A Summary of the Empirical Analysis for East Bavaria in the Context of the Changing World of Work

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ABSTRACT

The dynamic work environment increasingly necessitates the development of future skills, pivotal competencies attainable through part-time continuing education at universities. In East Bavaria, a rural region marked by diverse challenges, providers of continuing education should devise measures to impart future skills, with innovative didactic methods playing a crucial role. This study analyzes the needs of professionals in the region, deriving concepts for academic training. A quantitative online survey involving 396 East Bavarian participants identifies key future skills, providing initial guidelines for continuing education. Survey results are condensed and expanded through a mixed methods approach, incorporating qualitative insights from interviews with five experts. Resilience, dialogue and conflict competency, problem-solving ability, and digital literacy emerge as central future skills. The development of training for these competences should take into account the different needs of the target groups. Short, three-month blended learning formats without prerequisites or with relevant professional experience are recommended. Didactic approaches should emphasize practical relevance, transferability, and action orientation. Problem- and project-based methods, promoting exchange, are suitable, and a methodological mix can support future skills development. The role of educators is evolving towards mentors and coaches. This work substantiates existing theories and empirical evidence on target group orientation and didactic methods, providing insights for further research and practical applications. It is recommended that universities expand future skills training offerings and facilitate a combination of formal and informal programs for increased flexibility.

Die dynamische Arbeitswelt erfordert zunehmend die Entwicklung von Future Skills, die durch berufsbegleitende Weiterbildung an Hochschulen erworben werden können. In Ostbayern, einer ländlich geprägten Region mit vielfältigen Herausforderungen, sind Weiterbildungsanbieter aufgefordert, Maßnahmen zur Vermittlung von Future Skills zu konzipieren, wobei innovative didaktische Methoden eine entscheidende Rolle spielen. Die vorliegende Studie analysiert den Bedarf der Fachkräfte in der Region und leitet daraus Konzepte für die wissenschaftliche Weiterbildung ab. In einer quantitativen Online-Befragung mit 396 Teilnehmerinnen und Teilnehmern aus Ostbayern werden wesentliche Future Skills für die Zukunft identifiziert und erste Ansätze zur Konzeption von Weiterbildungsmaßnahmen abgeleitet. Die Ergebnisse der Befragung werden im Sinne eines sequenziellen und integrativen Vorgehens im Mixed-Methods-Ansatz mit einer qualitativen Studie verdichtet und erweitert, wobei qualitative Erkenntnisse aus Interviews mit fünf Experten berücksichtigt werden. Als zentrale Future Skills kristallisieren sich Resilienz, Dialog- und Konfliktfähigkeit, Lösungsfähigkeit und Digital Literacy heraus.

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Bei der Entwicklung von Weiterbildungsmaßnahmen für diese Kompetenzen sollten vielfältige Bedürfnisse der Zielgruppe berücksichtigt werden. Empfehlenswert sind kurze, maximal dreimonatige Blended-Learning-Formate ohne Vorkenntnisse oder mit einschlägiger Berufserfahrung. Bei den didaktischen Ansätzen sollten Praxisbezug und -transfer sowie Handlungsorientierung zentral sein. Problem- und projektorientierte Methoden, die den Austausch fördern, sind geeignet, und ein Methodenmix kann die zukünftige Kompetenzentwicklung unterstützen. Die Rolle der Lehrenden entwickelt sich hin zu Lernbegleitern und Coaches. Die vorliegende Arbeit untermauert bereits existierende Theorien und empirische Belege zur Zielgruppenorientierung sowie zu didaktischen Methoden und liefert Erkenntnisse für die weitere Forschung und die praktische Anwendung. Es wird empfohlen, dass die Hochschulen ihr Angebot an wissenschaftlicher Weiterbildung erweitern und eine Kombination aus formellen und informellen Programmen anbieten, um die Flexibilität zu steigern.

KEYWORDS

Future skills, part-time continuing education at universities, innovative didactic methods, East Bavaria, development of future skills

Future Skills, berufsbegleitende Weiterbildung an Hochschulen, innovative didaktische Methoden, Ostbayern, Entwicklung von Future Skills

1. Introduction

The world of work has changed significantly in recent years, driven by a number of megatrends that are influencing business models, job profiles and working practices (Schermuly, 2021, pp. 29, 43; Wippermann, 2020, p. 46). Companies and employees are facing substantial challenges in a VUCA world characterized by volatile, uncertain, complex, and ambiguous events that need to be adequately managed (Blum & Gabathuler, 2019, pp. 75–76; Wippermann, 2020, pp. 55–56). Alongside the challenges posed by the changing work environment, companies are grappling with a skill gap, as often the required competencies are lacking to navigate through changes (Kienbaum & StepStone, 2021, pp. 19–21; Mayer, 2021, p. 1). Companies can address the skill gap by hiring new professionals or by upskilling existing personnel (Europäische Kommission, 2021; Kienbaum & StepStone, 2021, p. 22). However, recruiting is hindered by the shortage of skilled workers, and the skill gap is expected to widen further (Kienbaum & StepStone, 2021, p. 19). Consequently, it is imperative for companies to emphasize the continued education of their employees (Bräutigam & Schindler, 2021, p. 137). In rural regions such as East Bavaria, the challenges of the skill gap and the shortage of skilled workers are increased by ongoing urbanization and the appeal of metropolitan areas to young professionals (Ruscheinski, 2023, pp. 11-12). Therefore, it is particularly crucial to focus on these regions and strive for the further qualification of existing professionals to reduce the skill gap (Schermuly, 2023, p. 26). One chance to promote future skills is through part-time continuing education at universities (Stifterverband, 2022, pp. 27–28). In the context of lifelong learning, skills can be developed and extended alongside work or other commitments (Bräutigam & Schindler, 2021, p. 137; Schiefner-Rohs, 2020, p. 409). Traditional education concepts with rigid curricula are likely to be less effective in developing future skills, highlighting the need for innovative didactic methods (Bräutigam & Schindler, 2021, pp. 137–138; Edelkraut & Sauter, 2023, p. 72–73; Ehlers, 2020, p. 4).

The present study aims to develop measures for a concept promoting future skills within the framework of part-time continuing education at universities, particularly in rural regions such as East Bavaria. The empirical findings could contribute to strengthening the region by enabling universities to develop demand-oriented offerings for continuing education or to adjust existing measures.

2 Background

2.1 Future Skills

To close the skill gap, the development of future skills is essential. The *Stifterverband* (2018, p. 4) describes future skills as competencies that will become increasingly important for professional development and/or active participation in social life across various sectors over the next five years. This definition explicitly indicates that competencies required only in specific fields, or those that are less important than others do not qualify as future skills. Edelkraut and Sauter (2023, pp. 71–72) particularly emphasize the constructivist and connectivist perspectives in the development of future skills, as both facilitate a self-directed learning process, with instructors acting as learning guides or coaches. It is also strongly emphasized that competencies cannot be effectively conveyed through seminars (Edelkraut & Sauter, 2023, p. 93).

In recent years, organizations and research groups have pursued the goal of identifying relevant future skills. Ehlers (2022, p. 21–22) underlines that not all studies are suitable for methodically describing future competencies. However, the *Stifterverband* study is methodologically well-suited and, due to its clear practical relevance, serves as the theoretical basis for the following. The Future Skills Framework, introduced by the *Stifterverband* in 2018, was expanded in 2021 and now includes 21 competencies in four categories. These categories are:

- **Technological competencies:** data analytics & ai, software development, user-centred design, it architecture, hardware/ robotics development and quantum computing

- **Digital key competencies:** digital literacy, digital ethics, digital collaboration, digital learning and agile working

- **Classic competencies:** problem-solving ability, creativity, entrepreneurship & initiative, intercultural communication, resilience

- **Transformative competencies:** judgment capability, innovation competence, mission orientation, change competence as well as dialogue and conflict competence

According to the *Stifterverband,* classic competencies are the most important for both 2021 and 2026. Transformative competencies rank second, followed by digital key competencies and technological competencies. The identified future skills are not equally important for all employees, with technological competencies primarily relevant for specialists, according to the *Stifterverband*. Therefore, they are excluded from the present study.

2.2 Part-time continuing education at universities

This study focuses on continuing education at universities. The target group comprises adults with at least an initial professional or academic degree. Therefore, continuing education at universities is a form of adult education (Reich-Claassen, 2020, p. 280). More agile than traditional university formats, it acts as a seismograph for changes in the economy and society (Faulstich & Zeuner, 2008, p. 234; Lehmann, 2020, pp. 83–88). Opening up universities to non-traditional target groups is one of the tasks of university continuing education. The role of academic continuing education in the development of the regional environment is little researched, but offers opportunities. Offer formats range from shorter certificate courses to master's programs. The *Deutsche Gesellschaft für Wissenschaftliche Weiterbildung und Fernstudium (DGWF)* recommends categorization levels, with programs requiring at least 180 ECTS for bachelor's degrees and approximately 60 to 120 ECTS for master's degrees (Deutsche Gesellschaft für Wissenschaftliche Weiterbildung und Fernstudium (DGWF), 2010, p. 3). Certificate courses can accrue between twelve and 60 credit points. It can be conducted through various event formats such as face-to-face, online, or blended learning. There is a multitude of terms for different formats, including microcredentials and microdegrees.

2.3 Designing continuing education to develop future skills

The integration of future skills into German degree programs and continuing education offerings at universities is gaining significance (Stifterverband, 2022, pp. 27– 28). Since 2016, 13 studies on this topic have been conducted, with initial developments in technological competencies becoming apparent. However,

there are few systematic comparative studies due to the complexity of measuring future skills. It is assumed that universities have been insufficiently focused on promoting future skills so far (Ehlers, 2022, pp. 9–10). Traditional educational programs at universities may not be beneficial to develop future skills (Ehlers, 2020, p. 4). Innovative teaching and learning methods such as agile learning could replace conventional course-based offerings. Continuous updating and adaptation of continuing education measures are necessary as future skills evolve. Lifelong learning is gaining importance, and universities must adjust their structures and content to provide future-oriented offerings (Schäfer, 2021, pp. 29–32). In addition, offers should be geared towards the current requirements and needs of the target group. The heterogeneity of participants requires individualization of learning formats, taking into account different learning preferences and prerequisites. Innovative didactic concepts are necessary to meet the demands of adults who value practical relevance, flexibility, and the compatibility of work and continuing education (Rump & Eilers, 2022, p. 107).

2.4 Special needs in East Bavaria

The structure of East Bavaria is predominantly rural (Bundesamt für Bauwesen und Raumordnung (BBSR), 2020). Rural areas are increasingly facing challenges compared to urban areas. As a result of ongoing urbanization and migration from rural areas, the sparsely populated areas are becoming more and more depopulated. This is increasingly weakening them and causing them to lag behind urban centers in terms of economic performance, among other things (Ruscheinski, 2023, pp. 11–12). Rural regions also face challenges in the area of education. For example, due to the low density of universities or continuing education institutions, attending such institutions is associated with longer travel times (Bundesministerium für Ernährung und Landwirtschaft (BMEL), 2023, pp. 23–26).

Furthermore, there is a decline in participation in continuing education programs in East Bavaria. For Bavaria as a whole, the decline from 2019 to 2021 is -6.2 %. For the two East Bavarian administrative districts, the decline is even more pronounced: -8.03 % for the Upper Palatinate and -8.74 % for Lower Bavaria (Bertelsmann Stiftung, 2021).

2.5 Research questions

The background clearly indicates the need for action there is in the field of continuing education for universities in East Bavaria. However, to be able to develop specific offerings, it is essential to align the content and formats with the requirements of the professionals in the region. Furthermore, the formats and methods of continuing education should be pedagogically suitable for the development of future skills.

From these requirements, the following four research questions arise, which are intended to be answered within the scope of this work:

1. What three future skills are significant for aspiring and existing professionals in East Bavaria?

2. Through which continuing education measures can the most important three future skills be developed by aspiring and existing professionals in East Bavaria?

3. With which didactic methods can the most important three future skills be developed by aspiring and existing professionals in East Bavaria?

4. What is the difference between the didactic methods to be used for the acquisition of future competences according to the future competence in question?

3 Methodology

As an empirical research method, a mixed methods approach was chosen. It involves a sequential process, consisting of two phases, with a deepening design where a quantitative study is followed by a qualitative study. In this approach, the qualitative study was prioritized, and the results of the first study were intended to be extended by the second (Kuckartz, 2014, pp. 77–78; Schreier & Odağ, 2020, p. 170). This mixed methods approach allows a comprehensive insight into the field of research. Practical implications can be derived as the findings of both methods complement each other (Schreier & Odağ, 2020, p. 168).

3.1 Study I: Quantitative online survey

Based on the theoretical foundations, a standardized quantitative online survey was

conducted as a first study. The Future Skills Framework from 2021 (cf. 2.1) served as a basis, including the categorization and description of skills to operationalize the variables.

To operationalize the construct of 'continuing education', the needs and interests of the target audience were contrasted with offerings of scientific continuing education. The target group for the survey was defined as employees and students who live, work or study in Lower Bavaria or the Upper Palatinate. From May 2nd to May 19th, 2023, an ad-hoc sample of participants was able to complete a standardized quantitative online survey. The data from the online survey was analyzed using descriptive statistics, including frequency distributions

and means. The survey resulted in a sample of N = 396, of which 154 were male and 235 female. Seven persons did not provide information. Respondents ranged in age from 17 to 69 years with a mean of 36.54 years. The distribution by occupation, higher education institution, place of residence of students and employees and place of work is shown in Figures 1–5. Participants (N = 396) had to evaluate15 future skills by rating the perceived importance of each skill. In order to consolidate this result, additional variables on interest in further training for future skills and participation in further training for a specific future skill were analyzed. These, along with the following variables, are based on a subsample (n = 284), as a filter question was used to inquire about general interest in
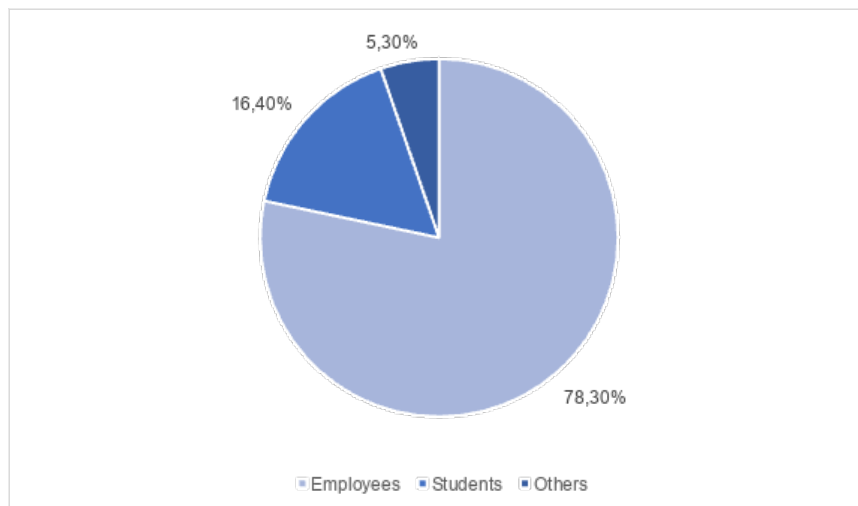

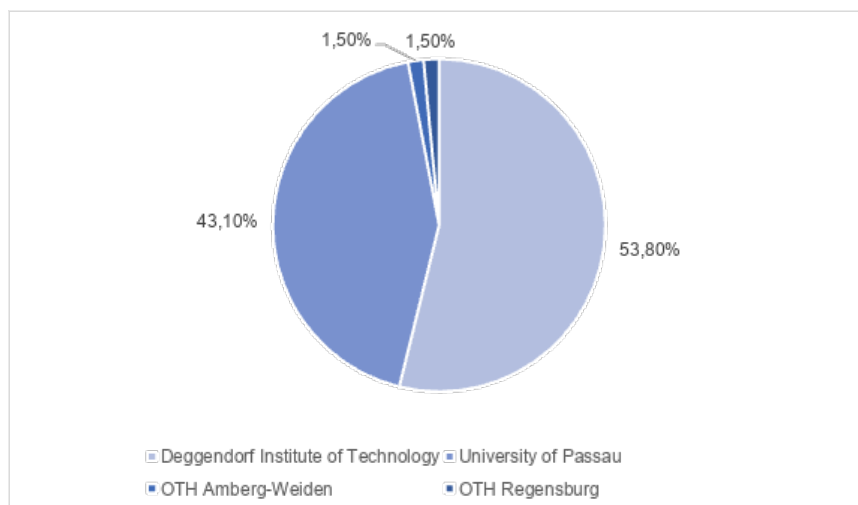Figure 1: Occupation of respondents (N = 396).

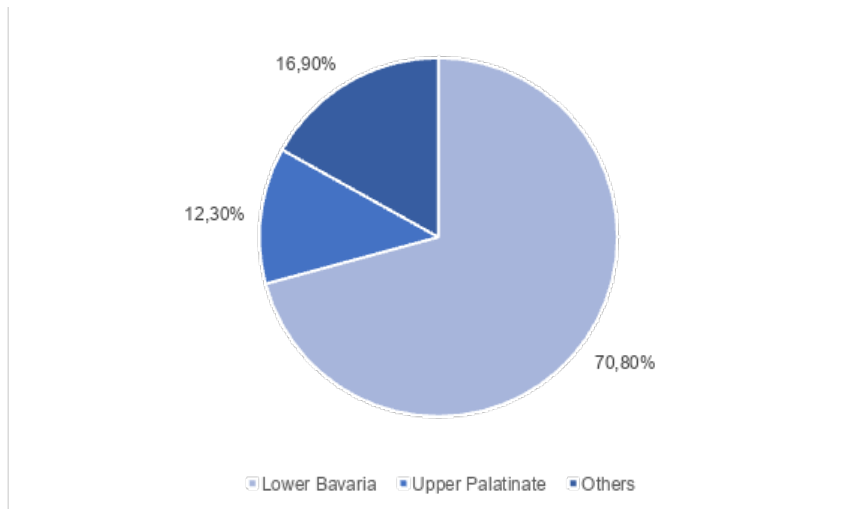Figure 2: Distribution by university (n = 65).

Figure 3: Distribution with regard to students' place of residence (n = 65).
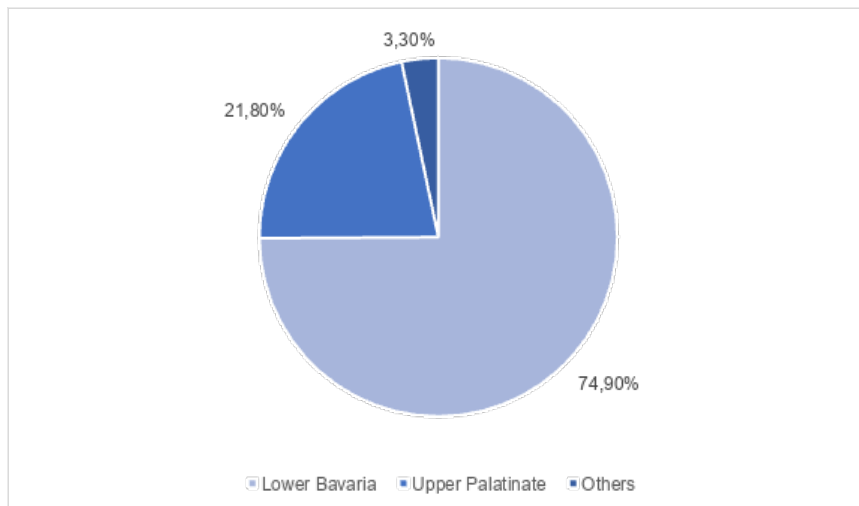

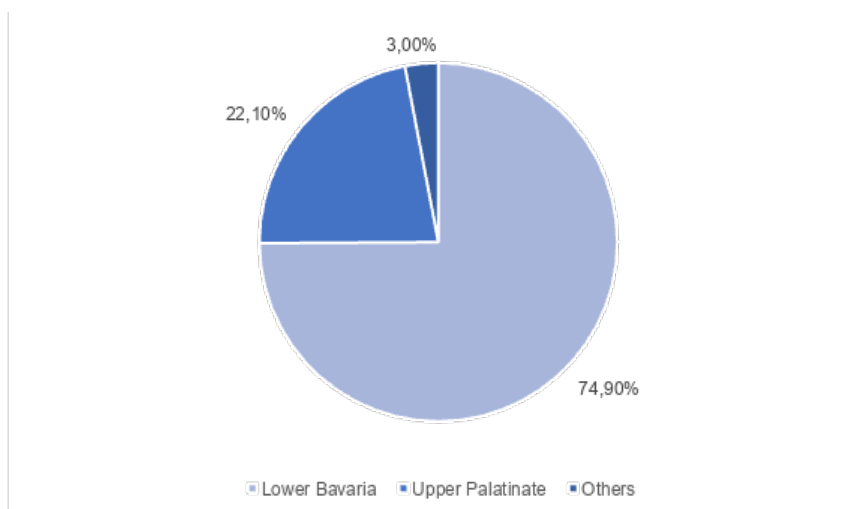Figure 4: Distribution in terms of employees' places of employment (n = 310).

Figure 5: Distribution in terms of employees' places of residence (n = 310).

Results: ranking of future skills on various dimensions

Fifteen future skills were rated by participants on a total of three dimensions: (a) *importance* (cf. table 1, column 5), (b) *interest* in continuing education (cf. table 1, column 6), and (c) *participation* in continuing education (cf. table 1, column 7). These ratings were then aggregated into a summarized score (cf. table 1, columns 1 and 2).

Regarding the *importance* of future skills, participants identified the following future competencies as most significant: (1) problem-solving ability, (2) digital literacy, and (3) resilience. Considering which three future skills are of interest for continuing education, (1) resilience and (2) dialogue and conflict competence take the first two places. Due to the same number of mentions, (3) problem-solving ability and (3) innovation competence are tied for third place. As to *participation* in continuing education, the ranking was as follows: (1) resilience, (2) dialogue and conflict competence, along with equal frequency, (3) change competence, and (3) digital learning. The summary of the rankings regarding importance, interest, and specific participation in continuing education related to each future skill is presented in Table 1 (columns 5–7). Table 1 also includes a ranking based on the average position (columns 1–2) and the frequency of placements in the top five rankings (column 3). To identify the top three future skills, frequencies of placement in top five and an overall average placement ranking were calculated. It is noteworthy that resilience, with an average ranking of 1.67 and 100 % placement in the top five rankings, occupies the top position regarding *interest* and *participation* in continuing education. Dialogue and conflict competence, with an average overall placement ranking of 2.67 and also 100 % in the top five rankings, holds the second position. Third in the average placement ranking is problem-solving ability, with a score of 3.67, even though it appears in the top five rankings with only 66.67 % frequency. Regarding average positions, there is a smaller gap between third and fourth versus fourth and fifth place. In addition, the future skill digital literacy (fourth place) is included in the top five rankings at 100 %. In contrast, only 66.67 % of the third-placed skill problem-solving ability is included. For this reason, research questions (1) to (3) are adapted to the most important **four** future skills and the subsequent study was based on the

Ranking by position Ø	Position Ø	Frequency in top 5 rankings	Future skill	Position: Importance of future skill	Position: Interest in continuing education	Position: Participation in continuing education
1	**1,67**	3/3	**Resilience**	3	1	1
2	**2,67**	3/3	**Dialogue and conflict competence**	4	2	2
3	**3,67**	2/3	**Problem-solving ability**	1	3	7
4	**4,00**	3/3	**Digital literacy**	2	5	5
5	6,00	1/3	Change competence	9	6	3
6	6,33	1/3	Digital learning	7	9	3
7	6,67	1/3	Digital collaboration	4	8	8
8	7,67	1/3	Innovation competence	14	3	6
9	8,00	-	Entrepreneurship & initiative	6	7	11
10	9,00	-	Agile working	8	10	9
11	10,33	-	Intercultural communication	12	10	9
12	10,67	-	Creativity	10	10	12
13	12,00	-	Digital ethics	11	13	12
14	13,67	-	Judgment capability	13	14	14
15	15,00	-	Mission orientation	15	15	15

Table 1: Ranking of 15 Future Skills

most important four future skills.

Revised research questions were accordingly modified to:

1. What **four** future skills are significant for aspiring and existing professionals in East Bavaria?

2. Through which continuing education measures can the most important **four** future skills be developed by aspiring and existing professionals in East Bavaria?

3. With which didactic methods can the most important **four** future skills be developed by aspiring and existing professionals in East Bavaria?

4. What is the difference between the didactic methods to be used for the acquisition of future competences according to the future competence in question?

Continuing education measures for the development of future skills

With regard to the type of continuing education in terms of the offered programs, 22.5 % of respondents prefer individual workshops or seminars without ECTS credits. Free lecture series receive approval from 18 %, and certificate courses (ranging from five to 15 ECTS) garner 13.4 % agreement among participants. As the preferred format for continuing education, half of the respondents opt for a blend of on-site and online components, known as blended learning. A part-time continuing education format is favored by 60.2 % of respondents, maintaining a significant lead over other formats. In terms of the duration, shorter formats dominate. 33.5 % of respondents can envision a duration between one and three months, and less than one month is considered by 23.2 %. When asked about the admission requirements for attending continuing education to acquire the selected future skill, 38.4 % of respondents indicate no specific requirements, while 32.7 % mention relevant professional experience.

3.2 Study II: Qualitative expert interviews

The results obtained in the first study were consolidated and supplemented with additional aspects in the second one through structured expert interviews. The interviewed experts play a special role due to their socially ascribed status (Bogner et al., 2014, p. 11; Helfferich, 2019, p. 681). Expert status is defined by characteristics such as education and professional activities, especially in the fields of adult and higher education, key competencies, future skills, and innovative teaching and learning methods. Typically, individuals in key positions in continuing education or in teaching and research areas, such as professors and researchers, possess the required expertise (Helfferich, 2019, pp. 680–681). The qualitative sample consists of five experts with extensive academic and professional backgrounds in relevant areas. Three of the respondents are professors with a focus on e-learning, innovative teaching formats, and continuing education. One person is a research associate in the field of future skills, and another one is the head of a center for key competencies. Four of the respondents work at universities of applied sciences, and one works at a university. Three work in Germany, and two work in Austria. The experts were interviewed outside of East Bavaria to avoid bias. The interviews were conducted via Microsoft Teams between July 24th and August 11th, 2023, and audio recordings were made to produce the transcripts.

The second study used a qualitative content analysis to interpret data from the interviews. An exploratory, predominantly inductive approach to category formation was pursued to explore novel research areas, such as the acquisition of future skills through scientific continuing education in the context of changing work environments. Data was analyzed using content-structuring qualitative content analysis, an analytical procedure that reduces data complexity based on categories and rule-guided to enable interpretation of the texts (Kuckartz & Rädiker, 2022, pp. 110–111). This methodological approach forms the framework for interpreting the conducted interviews. The main categories were initially developed deductively, then expanded inductively, and further differentiated with the help of inductively formed subcategories, allowing for various analyses of the material to be conducted subsequently.

4. Results

4.1 Research question (1)

What four future skills are significant for aspiring and existing professionals in East Bavaria?

The preliminary results of the first study reveal four future skills that are significant for both prospective and existing professionals in the region. These are (1) resilience, (2) dialogue and conflict competence, (3) problem-solving ability, and (4) digital literacy. Four out of the five experts agree with and confirm the ranking of the top 4 future skills. Therefore, the interviewed persons validated the results obtained from the quantitative survey. However, one expert noted that the ranking of the most important future skills depends heavily on the activities of the professionals, leading to a lack of clear agreement. Given the highly differentiated consideration of the choice between problem-solving ability and digital literacy, it is clear that adjusting the research question to a top 4 ranking was a logical decision.

4.2 Research question (2)

Through which continuing education measures can the most important four future skills be developed by aspiring and existing professionals in East Bavaria?

It becomes evident that the design of continuing education measures to develop future skills is essential and dependent on the target group. Therefore, it is sensible to start with a needs analysis, as conducted in study 1. Half of the respondents prefer individual workshops without ECTS, free lecture series or courses up to a maximum of 15 ECTS. The formats should be part-time, use a blended learning approach and last a maximum of three months. In addition, about half of the respondents from Study 1 prefer programs with no admission requirements or where only relevant work experience is required. With the help of the expert statements from Study 2, the requirements of the target group were examined with regard to a didactically, institutionally and organizationally sensible concept. In this context, the statements of the experts confirm the methodological approach of the present work.

Differences in the target group, including professional activities, competency levels, and experience with academic education or online teaching, significantly influence the design. Consequently, a continuing education measure could take place within a shorter timeframe if potential participants have already completed academic education or have experience in specific learning environments.

In general, it is crucial for continuing education measures aimed at developing future skills to offer participants a high degree of flexibility. In this context, it is advisable to design the measures with a modular structure, following a modular principle. This allows participants to select individual elements according to their interests and combine them, ultimately achieving a larger formal qualification. As the interviews show, this can work through the completion of small continuing education elements with at least 1 ECTS point. However, the experts interviewed identified an organizational challenge in ensuring the accreditation or recognition of achievements. Additionally, it must be ensured that the combination of modules follows a meaningful structure. Regarding the temporal scope, various possibilities are generally conceivable for developing future skills. If a specific future competence is to be developed, the implementation of Communities of Practice (CoPs) or the use of Massive Open Online Courses (MOOCs) and Microcredentials could be considered as short- to medium-term offerings. However, the challenge arises again, particularly with informal offerings, as to whether and how these can be credited. Furthermore, experts suggest that short- or medium-duration formats are likely to be more appropriate for individuals with an academic background. Whether future skills can be developed equally well with short- or medium-term offerings as with longer continuing education measures is assessed differently by the experts. Besides the scientific focus, as seen in master's programs, longer formats offer additional advantages. Various future skills can be developed and deepened sustainably, sometimes subconsciously, during longer-term continuing education. Additionally, longer formats allow for better variation in terms of the applied didactic methods and the instructors. This mix can positively impact competence development. As an additional incentive, formal certificates can be motivational for participants. Generally, it should be ensured during the conception phase that the formats are

interdisciplinary and enable a heterogeneous participant group. Regarding the event format of continuing education measures, the design depends significantly on the respective competency. For example, digital literacy can be developed entirely online.

To improve problem-solving ability, a high online component is possible, but on-site phases would also be beneficial. However, the development of resilience and dialogue and conflict competence requires on-site phases that enable participants to interact locally.

The future skills relevant to the target group can be developed through various approaches in continuing education. In addition to specific target group and needs analyses, which are essential for the conception, general aspects should be considered. For this work, study 1 represents a corresponding analysis of requirements and needs. Therefore, as the answer to research question (2), shorter formats without or up to a maximum of 15 ECTS in blended learning format, which can be completed part-time and without admission restrictions, are recommended.

4.3 Research question (3)

With which didactic methods can the most important four future skills be developed by aspiring and existing professionals in East Bavaria?

Didactic methods for developing resilience

To strengthen the future skill of resilience, didactic methods are needed that facilitate participant interaction and exchange during on-site events. Additionally, the selected instruments should enable a connection to individual problems or challenges in participants' everyday work. Concrete case studies can support the development of resilience. Participants in the training should learn practical methods that can be transferred to their personal lives, thus allowing for the sustainable development of resilience. Moreover, reflective elements are required, guiding or accompanying participants in conducting reflections. It is advisable to have an additional person act as a learning guide or coach, providing support parallel to the content-focused lecturer with a focus on feedback and assistance. Alternatively, one lecturer can be responsible for both content and methodological

and accompanying elements, necessitating a role shift for the lecturer to become a learning guide.

Didactic methods for developing dialogue and conflict competence

This future skill is best developed through didactic methods that encourage exchange, conducted in on-site events with other participants. Project- or problem-based methods are particularly suitable, requiring teams to solve or address tasks, problems, and concrete use cases. Through practical exercises, participants can observe and reflect on conflict conversations of others, engage in their own, and reflect on them. The exchange and feedback within the group facilitate the development of dialogue and conflict competence.

Didactic methods for developing problem-solving ability

Using action-oriented methods, the future skill of problem-solving ability can be developed both online and on-site. Practical exercises, as well as real projects, problems, and tasks that participants work on and solve collaboratively with others, are effective. It is important to ensure that groups are as interdisciplinary as possible to obtain diverse perspectives on the problem or task, contributing to the development of problem-solving ability. Additionally, participants should be guided with feedback during the learning or problem-solving process. Since improving problem-solving ability often involves addressing problems and tasks with no predefined solution approach and, therefore, usually no completely right or wrong path, feedback by the lecturer is essential to guide participants through the learning process.

Didactic methods for developing digital literacy

For improving digital literacy, methods for imparting foundational knowledge are particularly effective. Online-based self-learning formats, completed asynchronously, as well as on-site events, can be utilized for this purpose. In addition to knowledge transfer, exercises or practical applications are necessary to apply and practice what has been learned. In the context of integrative courses, it is sensible to begin with knowledge transfer elements and then proceed to practice this knowledge.

Building on this, further or more in-depth knowledge can be conveyed, which should be applied and practiced again. Suitable hardware and software for the respective content can support the application of knowledge in real-world scenarios.

4.4 Research question (4)

What is the difference between the didactic methods to be used for the acquisition of future competences according to the future competence in question?

According to experts, there are both overlaps and differences in the appropriate didactic methods for developing the four future skills of resilience, dialogue and conflict competence, problem-solving ability, and digital literacy. Differences become apparent, primarily related to whether knowledge transfer, coaching, reflection, or exchange are necessary or helpful for fostering each respective future skill. As stated by the interviewed specialists, methods for knowledge transfer, for example, are not necessarily required for the development of resilience, dialogue and conflict competence, and problem-solving ability. Coaching, on the other hand, is not necessary for fostering dialogue and conflict competence, problem-solving ability, and digital literacy. Furthermore, there is no need to use reflection-oriented methods to foster problem-solving ability or digital literacy. Additionally, the experts assume, that the improvement of digital literacy requires the use of appropriate hardware and software, but not necessarily methods that encourage exchange among participants. Another difference lies in whether the development of future skills is possible purely online. The experts' statements show that this is only the case for problem-solving ability and digital literacy.

5 Discussion

5.1 Identification of the most important future skills

The quantitative survey results revealed resilience, dialogue and conflict competence, problem-solving ability, and digital literacy as key future skills.

Overlaps are observed with the ranking from the Stifterverband, where problem-solving ability and dialogue and conflict competence emerge as the most important future skills for both 2021 and 2026. The top four future skills identified in study 1 were further validated through expert interviews, although there were differing views on the rankings of the third and fourth positions. It is also evident that the ranking of future skills based on their importance is dependent on the target audience. Since the sample in study 1 is not representative of the overall population of professionals in East Bavaria due to an ad hoc sampling, the results cannot be generalized to the entire population. Nevertheless, a trend can be inferred, and these four identified future competencies form the basis for answering the remaining three research questions. From the results of research question (1), the following hypothesis can be generated for further studies:

H1: There are differences in the importance of future skills depending on the target audience.

5.2 Continuing education measures concept to develop future skills

The results of the quantitative survey indicate that respondents prefer shorter formats with or without a formal degree, conducted in a blended learning format, and accessible without restrictions, or with professional experience as a prerequisite for admission. These results provided a basis for discussion in the qualitative interviews. The experts emphasized that the design of continuing education measures significantly depends on the target group and confirm the necessity of audience orientation as per theory. Furthermore, it is highlighted that continuing education formats for the development of future skills should be designed to be as flexible as possible. In this context, the best solution would be a modular principle. A mix of continuing education formats from different providers is also conceivable. However, this implies significant conceptual, organizational, and potentially legal effort for the institutions. Recognition of various formats must be ensured. In terms of timeframe, the prospects of shorter forms of continuing education for future skills development are questionable. Therefore, success tends to be achieved only with longer offerings. However, literature on adapting continuing education in the context of future skills suggests that universities must become more agile and flexible to keep up with the pace and changes in the working world. This also requires a flexible adjustment of offerings and content of continuing education measures, which

is often not feasible with rigid curricula of study programs. Additionally, literature recommends developing shorter formats to develop future skills and testing and evaluating them in line with the exploratory nature of continuing education at universities (Stifterverband, 2022, p. 28). Due to the discrepancy between the obtained results and the theoretical background presented in 2.3, this aspect should be explored in more in-depth studies. The following hypotheses can be derived from the results of the second research question, which need to be examined in subsequent research:

H2: Continuing education formats at universities with a duration of up to three months are suitable for developing a future skill.

H3: For target groups that differ in terms of educational level, an adapted concept of continuing education measures at universities in terms of duration is required.

H4: For target groups without academic background, continuing education measures at universities must be designed with a duration of more than six months to enable the development of a future skill.

5.3 Didactic methods for developing future skills

Depending on the respective future skills, different didactic methods can be conducive to competency development. For all four future skills, methods that enable practical relevance or transfer and are action-oriented are suitable. Additionally, problem- or project-based methods are very helpful in improving the four future skills. Furthermore, didactic tools that work especially well in face-to-face events are useful, as developing all four competencies in on-site events is suitable. It is evident that a mix of different methods can contribute to the development of future skills. Ideally, measures are meaningfully combined, allowing for the acquisition of knowledge, stimulating action, and reflecting on the developmental process. In this context, there is agreement with the theory that a meaningful combination of diverse didactic methods is required to achieve the best possible success. However, it is also important to reconsider the role of lecturers, as supporting the development of future skills, for example, in project-oriented methods, requires learning companions who provide coaching assistance in

the developmental process. These findings can be encapsulated in the following hypotheses:

H5: With a mix of didactic methods, future skills in continuing education at universities can be developed most effectively.

H6: To develop future skills, there is a need for a change in the role of lecturers towards learning companions.

5.4 Differences in didactic methods for developing future skills

Besides didactic methods that can contribute to the development of all four future skills, there are also measures that are better suited for certain competencies than others. For this reason, the differences regarding the methods to be used are examined with research question (4). In this context, it becomes apparent that elements of knowledge transfer, as well as the use of appropriate hardware and software, are helpful primarily for developing digital literacy. Coaching methods, on the other hand, can contribute more to the improvement of resilience. Furthermore, differences emerge regarding exchange-based methods such as peer learning. These formats are helpful for the development of resilience, dialogue and conflict competence, as well as problem-solving ability. Regarding digital literacy, no benefit is expressed by the experts in this regard. According to the expert, reflection-oriented methods seem to be helpful for improving resilience as well as dialogue and conflict competence, but no benefits are mentioned for the development of problem-solving ability and digital literacy. From this, the following hypothesis can be derived:

H7: The suitable didactic methods for developing future skills differ in relation to the competency to be imparted on participants.

5.5 Limitations

This study had to be completed within 6 months. For this reason, it was only possible to deal with the subject of the research in a limited way in terms of time and content, but no in-depth analysis was possible. Additionally, the application of the Future Skills Framework is somewhat limited, as it strictly separates digital and technological competencies and assumes that technological future skills are only needed by a smaller group of specialists.

This aspect is critical, considering that it is often challenging to distinguish digital and technological competencies from each other. Despite the discourse around the framework, it forms the substantive basis of this work, as it incorporates requirements from the business and societal perspectives, has been methodically developed in a traceable manner, and places a particular focus on universities and continuing education. Another limitation of the work lies in the sample selection for the quantitative survey. Due to insufficient financial and personnel resources, no random, representative sample could be drawn. The analysis of the demographic variables of the quantitative survey shows that approximately 96 % of the surveyed students study in Lower Bavaria, and about 75 % live in Lower Bavaria. Similarly, about 75 % of the employed individuals work and live in Lower Bavaria. This reveals a distortion due to the arbitrary sample selection. Another aspect to be critically viewed is the lack of definition of the target group for which the continuing education measures are intended. This was only limited to aspiring and existing professionals in East Bavaria. However, it becomes clear that a more detailed examination beforehand or at least during the evaluation of the quantitative survey would have been required to design measures for a specific target group.

6 Conclusion

In general, it is recommended to expand the offerings of continuing education at universities, as it significantly contributes to lifelong learning and enables further qualification alongside work or private commitments. In this context, universities play a crucial role in counteracting the shortage of skilled workers and developing employees, companies, and the entire region. Furthermore, universities themselves benefit from a well-developed continuing education offering, as it opens up an additional financial resource for them. Through collaboration with providers of informal continuing education opportunities, the attractiveness of continuing education can be increased, and the offerings can be better tailored to the needs of the target group. As a next step, a comparison of the results of this work with the existing continuing education offerings of universities in East Bavaria should take place. This can identify overlaps and differences, allowing the offerings of respective institutions to be adjusted. In the conception of new measures and the adaptation of existing ones, it is advisable to further narrow down the target audience. This might encompass access restrictions or professional activities, as these factors can significantly influence further conception. The narrower the target group, the more precise and audience-oriented the conception, development, and implementation can be. However, care should be taken not to limit the target group too much, as this may lead to a loss of the benefits of heterogeneous groups, which significantly contribute to competence development due to their interdisciplinary and multiperspective nature. After implementing measures, they should be regularly evaluated and, if necessary, adapted.

In addition to the prospective development of continuing education at universities based on the results obtained from this research, it is advisable to expand the current study. This includes the analysis of existing data from both quantitative and qualitative studies. Possible quantitative analyses could identify differences between target groups regarding relevant future skills. This should be evaluated among students and employees, students of different disciplines, or employees from different industries. With the data material from the qualitative study, additional analyses can also be conducted, e.g. a comparison between German and Austrian universities. Future research could also expand the current study by enlarging the sample of expert interviews to allow for a comparison between universities and universities of applied sciences.

With this study, the research questions have been answered, and agreements between theoretical background from section 2 and the obtained results have been identified. A significant insight is that there is a need for a stronger focus on continuing education at universities to enable lifelong learning. Additionally, traditional offerings should be reconsidered and adapted to the requirements of the target audiences.

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