



AI Campus

The Learning Platform
for Artificial Intelligence

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Micro-credentials and micro-degrees

**Current developments and potentials for educational
practice based on the example of the AI Campus**

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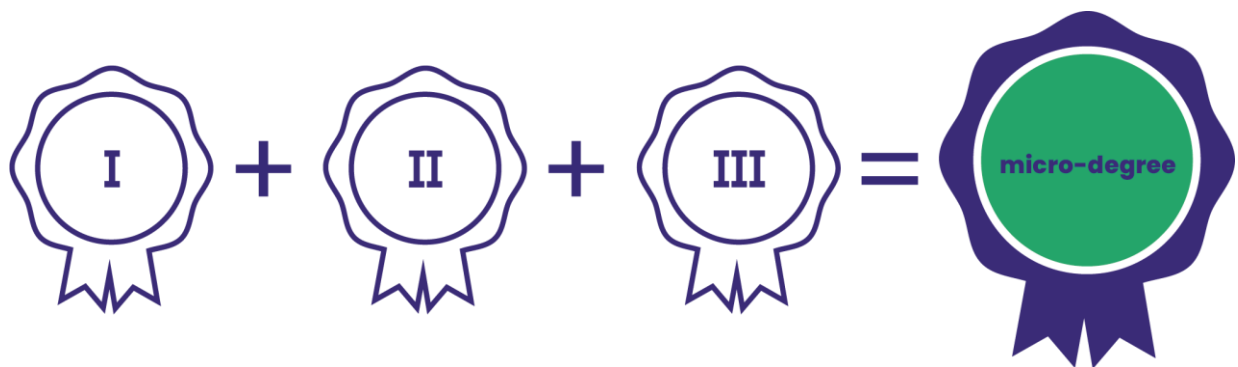


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Abstract

Micro-credentials and micro-degrees are increasingly being discussed in education policy and practice as a flexible and innovative form of qualification. This discussion paper outlines the current status of national, European and international activities on micro-credentials and micro-degrees on digital learning platforms, in higher education and in vocational education. Taking the AI Campus – the Learning Platform for Artificial Intelligence – as a use case, it presents current practical developments and perspectives. Central to this is the presentation of a working definition of micro-credentials and micro-degrees, considering the current academic discourse, as well as the demonstration of two planned AI Campus micro-degree programmes. Finally, an outlook will be offered related to the AI Campus' plans for advancing the development of micro-degrees and helping them to take shape. The focus of this paper is on the German and European university landscape.

This discussion paper is a translation of the original German paper published in August 2022. Relevant studies and data are as of mid-2022. The examples of the AI Campus have been updated to early 2023.

1. Overview of micro-credentials and micro-degrees

Coursera, edX and FutureLearn already offer them as a matter of course. On German digital learning platforms, however, prospective learners usually search in vain. The topic here is micro-degrees: short, detailed online certificate or qualification programmes that comprise a structured learning programme on a specific topic. Similar certificates or programmes are often referred to as micro-credentials, which is why there is generally a large degree of inconsistency in the use of these terms, which is exacerbated by the wide variety of names used for the qualifications on large digital learning platforms.

Micro-credentials and micro-degrees have become established primarily in order to attract affluent customers from the business world or to retain their loyalty with new programmes, particularly in the international digital learning platform market. This is because the innovative micro-qualifications – unlike complete degrees or complex certificates – can be acquired in a much shorter period of time and thus seem perfect for meeting current professional qualification requirements or individual training desires quickly and without red tape. Moreover, an increasing number of micro-credentials or micro-degrees can already be stacked together to form full formal qualifications, making them attractive to stakeholders with higher qualification goals. The idea is also gaining momentum at a political level. By 2025, the European Commission wants to have taken all necessary measures for the wider use, transferability and recognition of micro-credentials in the EU member states (European Commission, 2020), while the current German federal government is planning to examine the introduction of micro-degrees for further academic education (SPD et al., 2021).

This discussion paper provides an introductory overview of relevant national, European, and international activities for micro-credentials and micro-degrees on digital learning platforms, both in higher education and vocational education. In addition, this paper presents current developments and

potentials for educational practice based on the example of the AI Campus , including a working definition, certification figures, and two planned micro-degree programmes. Finally, it outlines which micro-degrees projects AI Campus is aiming to advance.

The AI Campus is a pilot project funded by the German Federal Ministry of Education and Research (BMBF) and Dieter Schwarz Foundation. The learning platform was published as a beta version in mid-2020. Its focus is on prototyping a digital learning platform specialising in AI. The Stifterverband, the Charité, the German Research Center for Artificial Intelligence (DFKI), the Baden-Wuerttemberg Cooperative State University (DHBW), the FernUniversität in Hagen, the Hasso Plattner Institute (HPI), the Humboldt University of Berlin, the mmb Institute and NEOCOSMO are developing the AI Campus together with numerous partners with regard to innovative digital education in the field of artificial intelligence.

1.1 Towards a clarification of terms

A more in-depth study of micro-degrees and micro-credentials immediately reveals one of the biggest challenges associated with these topics: the search for a clear definition of terms. For example, to date the term 'micro-credentials' has been used inconsistently at a European level. While projects such as MicroHE and MICROBOL¹ refer to both – short, detailed learning formats on the one hand and assessed records of achievement on the other – the European Commission understands micro-credentials solely as 'evidence of learning outcomes that a learner has acquired after a short, transparently graded learning experience' (European Commission, 2020, p. 10). Initiatives such as the European MOOC Consortium (EMC)² and the European Consortium of Innovative Universities (ECIU)³ have also endeavoured to develop their own definitions and, in some cases, formulate very specific requirements for micro-credentials (here understood as learning programmes) (The European MOOC Consortium, 2019). These include, for example, a total workload of 100 to 150 hours, a requirement for European Credit Transfer and Accumulation System (ECTS)⁴ points and adherence to certain levels of the European Qualifications Framework (EQF) (The European MOOC Consortium, 2019). This brief overview impressively highlights the inconsistent use of the key 'credential' concept – firstly as record of achievement and secondly as a learning format (Orr et al., 2020; Rentzsch, 2021).

This definitional heterogeneity or 'semantic confusion' (Rentzsch, 2021) is also reflected in the range of international digital learning platforms. For instance, Class Central – a meta-platform for searching for online courses from different providers – identified a total of eleven different qualification titles for the small-scale learning offerings of five platforms as far back as 2018, ranging from Nanodegree (Udacity) to MicroMasters/XSeries (both edX) as well as MasterTrack Certificate (Coursera) or Graduate Certificate (FutureLearn) (Pickard, 2018). With the considerable expansion of the range of corresponding formats in recent years, the variety of terms is likely to have increased even further. Regardless of the

¹ <https://microcredentials.eu/>

² <https://emc.eadt.eu>

³ <https://www.eciu.org>

⁴ <https://education.ec.europa.eu/tr/education-levels/higher-education/inclusive-and-connected-higher-education/european-credit-transfer-and-accumulation-system>

diversity of terminology, micro-credentials share a basic idea of the greatest possible modularisation and aggregation of the content in academic and, increasingly, vocational education programmes. Individual courses can be stacked into specialisations or so-called 'XSeries', with some courses leading to partial degrees such as a MicroMasters or even complete degrees. They aim to be at least a precursor to a formalised degree. Many of them offer the possibility of earning credits for a course of study, although this is usually only possible if the students enrol in the course of study associated with the micro-credential. This is the case with Coursera's MasterTracks as well as edX's MicroMasters (Pickard, 2018). Unlike, for example, master's degree programmes that focus on continuing education, micro-degrees – in the sense of a set of coordinated, shorter learning units – are more specialised and focussed on specific activities. A single micro-degree cannot replace a master's degree.

1.2 National and international perspectives and developments

According to 94% of the experts surveyed as part of the *mmb Learning Delphi 2021/22* study, the use of smaller and fragmented learning formats will be of central importance in companies in German-speaking countries over the next three years.⁵ In addition, three-quarters of respondents (77%) see micro-credentials as an attractive opportunity for self-determined and non-formal learning (*mmb Institut GmbH, 2022*). Micro-credentials and micro-degrees can help employees keep up to date within their field of work or provide access to a related professional field. This makes them equally appealing to the learners as well as employers. They can be completed within a short period of time and enable a focussed acquisition of skills with a strong connection to specific activities or professional fields (Perna, 2021).

Experience in the **US market** shows that micro-degrees are already received well there. A study by Northeastern University provided evidence of a corresponding and very clear trend in the hiring of job applicants, with a shift away from formal qualifications to clear evidence of skills and competencies. For example, around one in three (34%) HR managers from the 750 companies surveyed now prefer evidence of competencies over qualifications – a significant increase compared to the previous survey in 2018 (23%) (Gallagher, 2018). A further 42% of the respondents said they were moving in this direction. This is in line with how just under half (44%) of those surveyed consider university degrees to be very or extremely relevant, while just under half (47%) believe that, in the medium term, microcertificates will diminish the importance of university degrees when hiring employees (1EdTech Foundation, 2021).

This can also be seen in practice. Google, for example, now employs more and more people without a vocational or university degree and is therefore joining a growing group of corporations – including Apple, Starbucks, IBM, Bank of America, and Ernst & Young – that require formal qualifications from job applicants less and less. Traditional academic and professional qualifications are, at least in some fields and from a global perspective, increasingly being replaced by competencies and specific skills (Forrest, 2021). On the other hand, little is known about the perception and acceptance of micro-degrees in job application processes at European and/or German companies. Non-representative

⁵ As part of the *mmb Learning Delphi*, e-learning experts from the German-speaking countries (Germany, Austria, and Switzerland) are regularly asked about current trends in education.

surveys indicate, however, that micro-degrees are also perceived positively in local jobs market applications providing they have a specific link to the job profile and the digital platform offering the micro-degree or the experts behind it are seen and recognised as such (Edukatico, 2020).

In line with the trends described in vocational education and training, micro-credentials and micro-degrees are playing an increasingly important role mainly in the international digital learning platform market, especially in appealing to high-wage target markets in the business world. While some of the courses themselves are still free – in keeping with the free massive open online course (MOOC) culture with which most providers started with – fees are charged for assessment and certificates. However, the trend towards commercialisation is increasing, with learners having to pay more and more for accessing the corresponding programmes themselves. There are now over 1,500 micro-credentials on international digital learning platforms (Shah, 2021), some of which can be stacked into more complex micro-degrees and play an increasingly central role in the development of this business model. In 2012, edX was the first course provider to introduce a micro-degree programme with its XSeries. It was developed by the renowned Massachusetts Institute of Technology (MIT). Consequently, edX pursued a strategy of making continuing education at an academic level accessible to a wider audience from an early stage. Shortly afterwards, Udacity introduced ‘Nanodegrees’ – certificates that related to course bundles rather than individual courses lasting a few weeks. What made them special was that they were not academic in nature but certified by tech companies such as Amazon, Facebook or Google, which is why this phenomenon was referred to as ‘The Google University’ in the ZEIT newspaper (Drösser, 2015).

Compared to the wide range of micro-credentials and micro-degrees available on international digital learning platforms, the **German education market** is rather cautious in this field up to now. The still-young German market for micro-credentials and micro-degrees has so far only featured very small numbers of **public universities**, which are generally rather sceptical of micro-learning programmes. The German Rectors’ Conference (HRK) recommended that universities ‘proactively deal with the topics of micro-degrees and badges’ (Hochschulrektorenkonferenz, 2020, p. 3), especially to anticipate innovative developments in the field of teaching and remain competitive. Nevertheless, the potential fields of application being considered are clearly limited. For instance, micro-degrees are intended to be used primarily as part of orientation courses for students, advanced training courses for employees, or special extracurricular courses for ‘high-potential’ learners – i.e. predominantly as part of continuing academic education and non-degree programmes. The German Rectors’ Conference does not see any added value in integrating micro-degrees into the standard academic offering. Rather, it fears a modularisation of degrees and speaks in its position paper of a ‘risk of fragmentation of the knowledge canon’ (Hochschulrektorenkonferenz, 2020, p. 4), criticising the ‘often commercial use of very small parts of conventional courses of study’ (ibid.). The German Bundesrat (Federal Council) and four of its committees drew a similar conclusion in their joint ‘Proposal for a Bundesrat Recommendation for a European Approach to micro-credentials for Lifelong Learning and Employability’ published in May 2022 (Bundesrat, 2022). In it, the Bundesrat made clear that the establishment of micro-credentials and micro-degrees must not lead to a ‘weakening or replacement of initial education, higher education, vocational education and training or traditional qualifications’ (Bundesrat, 2022, p. 2). The recommendation went on to say that the principle of comprehensiveness and structure ‘must not be replaced by

the arbitrary accumulation of small and very small learning units' (ibid.). Stakeholders in **vocational education and training** have a similar view. They point out that professional competence⁶, understood as a holistic, overarching qualification objective for dual vocational education and training in Germany, cannot be acquired on the basis of small-scale learning programmes or an accumulation thereof (Deutscher Industrie- und Handelskammertag & Deutsche Industrie- und Handelskammern, 2021). The structural peculiarities of the German vocational education and training system itself merits caution when attempting to define scenarios for the German education market based on international developments without reservations.

In some scattered cases, **public German universities** have been offering micro-credentials and micro-degrees in cooperation with US-American platforms for some years. Since 2017, RWTH Aachen University has been the first German university to offer the possibility of obtaining a MicroMaster in 'Managing Technology & Innovation: How to Deal with Disruptive Change'⁷ through the edX digital learning programme. This can then be credited towards a full-fledged master's degree programme. TU Munich is also present on edX and while it does not offer a MicroMasters, it does offer 'professional certificates' for using the Sig Sigma management system.

At the moment, **private German universities** are already visibly more active in this field. They are seemingly looking to tap into an additional market with academic micro-credentials and micro-degrees, often appealing to an affluent target market of employees and lifelong learners. For example, the private Wilhelm-Büchner-Hochschule in Darmstadt has been offering nanodegrees for some time now, covering topics such as IT security, app development, e-mobility, and entrepreneurship. As is usually the case in the international market, the learning content comes from accredited bachelor's or master's degree programmes, thus ensuring commercially exploitable synergy effects. In addition, the private AKAD University in Stuttgart (a purely distance-learning university) offers an online course on the topic of 'Digital Transformation' and also refers to it as a 'nanodegree'. Participants receive digital access to all learning content for a maximum of six months and can explore it at flexible times. Those who pass the subsequent, voluntary exam receive a digital certificate and can have their nanodegree credited to a bachelor's degree as a module or towards a more comprehensive further-education programme at AKAD (von Elm, 2020). Another (private) university provider of micro-credentials is Euro FH, which offers different 'micro-courses' on human resources and political topics. They are each concluded with a certificate from the university.⁸ As in the international market, key characteristics such as costs, duration and designation vary in the micro-credentials and micro-degrees from German providers. This could also make it increasingly difficult to find orientation in the German market as the offerings multiply.

⁶ Germany's Vocational Education and Training Act (*Berufsbildungsgesetz*, BBiG) defines professional competence as the 'professional skills, knowledge and capabilities' that are necessary for the exercise of a qualified professional activity in a changing world of work (BBiG section 1(3)).

⁷ <https://www.rwth-aachen.de/cms/root/Die-RWTH/Aktuell/Pressemitteilungen/Maerz-2017/-ngeb/Die-RWTH-Aachen-bietet-den-Micro-Master-a/?lidx=1>

⁸ <https://www.euro-fh.de/hochschulkurse-mit-zertifikat/mikrokurse/>

In addition to the small number of university providers, there are **private German educational institutions** and **tech companies** entering the market with micro-learning programmes. For example, Google offers in-house training in the form of innovative certificates ('Google Career Certificates') they claim are comparable to university degrees. It involves Google employees training interested colleagues to become UX designers or data analysts within a six-month period (Seele, 2020; Sonnabend, 2021). In cooperation with the digital learning platform Udacity, Bertelsmann University has since 2019 offered a scholarship programme that focusses on strengthening technological competencies such as cloud computing, data and artificial intelligence.⁹

1.3 Potential and challenges in Germany

If seeking to exploit the **potential of micro-credentials and micro-degrees** for the German education market, the industry's current and future needs for skilled workers and qualifications are key points of orientation. During the Covid-19 pandemic, the demand for further training in digital skills became particularly significant – and with it, so too did the range of companies offering training. In addition to the overall quantitative range of thematically relevant training courses, the share of programmes in digital formats also increased noticeably: Over 90% of companies active in continuing education and training used at least one digital learning medium in 2019, up from 84% three years earlier (Seyda, 2021). If it were up to business, digital services and tools will continue to be used more frequently in the future to train employees. According to an online cross-industry survey of more than 550 German companies with at least 50 employees, more than 50% plan to carry out their qualification activities digitally in the long term (Kirchherr et al., 2020). They include short learning formats (66%) as well as full-day seminars (51%). In a study on continuing education and training in 2025, 61% of nearly 400 people surveyed from different hierarchy levels, companies and industries believe that learning formats need to be shortened and more focussed due to the shorter attention span of learners (Bitkom Akademie, 2021).

There is another noteworthy trend, too: companies are covering new skills and competencies required because of digital transformation primarily from their existing workforce. The 're-skilling' or 'up-skilling' strategies described in personnel development – i.e. further, specialist, action-oriented training for employees within their existing job profile – are thus the top priority when it comes to securing skilled workers within a company. This means that employees may end up moving towards a new role within their company in addition to further developing their own job profile. Currently, almost half of European companies focus primarily on re-skilling in order to meet the challenges of digital transformation while only 7% rely primarily on new hires (Billing et al., 2021).

These findings can be used as a further indicator that today's demand for further training mainly arises and fulfilled in the working environment itself. As a result, companies and other (also public) institutions are increasingly faced with the challenge of adapting skills and learning programmes as well as the learning environment itself to the new requirements. This is in line with the trend observed in continuing vocational education towards shorter, more flexible, modular and less formalised learning

⁹ <https://bertelsmann-university.com/de/individual-campus/program-information/udacity-technology-scholarship-program.html>

programmes, while at the same time gradually moving away from complex, longer qualification activities and purely face-to-face formats.

Micro-credentials and micro-degrees may indeed have potential in academic education – as the German Science and Humanities Council stresses in its latest recommendation: they can ‘complement a comprehensive study programme as well as certificate studies and modularised programmes within the framework of further academic education’ (German Science and Humanities Council, 2022, p. 32). At the same time, the expert body emphasises the need for quality standards. The supply of academic micro-certificates offered by German universities is still quite small, with in 2022 only around one in five universities currently offering them. Nevertheless, a recent though non-representative survey of 155 German universities conducted by the German Academic Exchange Service (DAAD) shows that a further 8% are planning to use them in the medium term – and another 15% are already conducting an internal discussion process (DAAD, 2022). Accordingly, future progress can be expected, and – in addition to possible changes in educational policy – individual projects definitely could have a signal effect.

Two key **challenges** are particularly noteworthy with regard to micro-credentials and micro-degrees: firstly, recognition and crediting, and secondly, the discussion about a uniform understanding of quality.

1.3.1. Recognition and crediting

With the growing range of micro-credentials, the question of their certification and the possibilities for recognising or crediting the learning achievements documented through them in different educational contexts is also becoming increasingly important. As stated before, there is a fairly wide range of **course certificates** in the international market – often with different names. However, most of them are simple **confirmations of participation** that do not indicate any **assessment** and merely document course attendance. In most cases, 50% to 60% of the course content has to be completed. Providers or their academic cooperation partners in Europe are now also increasingly awarding ECTS points for their micro-credentials or -degrees; in addition, some of the (attendance) certificates can also be shared in the form of badges¹⁰ via user profiles on professional online networks.

Mutual recognition of academic achievement has become part of the European higher education agenda as part of the **Bologna reform** and undergone a variety of developments since then. In Germany, the term ‘recognition’ generally refers to achievements or competencies achieved or acquired at one university and recognisable with the aim of continuing a student’s studies in another degree programme or at another university.¹¹ These rules are based in particular on the **Lisbon Convention**, which was drawn up in 1997 after being spearheaded by the Council of Europe and UNESCO. Firstly, they address issues of access to higher education and, secondly, the recognition of periods of study and previous qualifications (Benning et al., 2017). In principle, however, the existing recognition regulations are limited to formal educational qualifications and/or records of achievement

¹⁰ Open Badges is a system of digital certificates or learning badges for documenting informal online learning. It was developed in 2011 in collaboration with the Mozilla Foundation and the MacArthur Foundation. Today, Open Badges is the world’s leading format for digital badges and has been adopted by numerous technology platforms around the world.

¹¹ <https://www.hrk-modus.de/en/information/topics/recognition>

within their framework. Although the increasing emergence of MOOCs, including in Europe, raised the possibility of embedding open digital learning formats into accredited study programmes and the associated recognition issues, there are still no uniform rules for competencies acquired in digital educational contexts. This proves to be a particular challenge in connection with the potential for recognising micro-learning programmes, which are generally regarded as non-formal education programmes. Against this background, education policy initiatives and stakeholders have recently made extensive recommendations on the recognition of learning achievement in digital learning formats. At its core is the establishment of university-wide and transparent procedures, instruments and systems for crediting that explicitly include digital learning programmes. In addition, the European MicroHE initiative proposes a 'credit supplement' which provides detailed information on the proof of micro-credentials. It also suggested designing a metadata standard, which has now been implemented via the new Europass platform¹² (MicroHE Consortium, 2020).

With the increasing availability and uptake of digital learning programmes, the opportunities for acquiring competencies outside universities have both multiplied and simplified. The spectrum of informally acquired learning outcomes demanding the creation of appropriate crediting options has particularly grown. In the future, it can be assumed that more young people with a wide range of backgrounds will be starting a degree programme and looking for ways to have their digitally acquired, non-university learning outcomes credited to a higher-education programme (Burchardt, 2020; Rampelt et al., 2018).

Although the formal basis of crediting explicitly includes learning outcomes acquired informally or non-formally, there is still a lack of appropriate (uniform) rules, methods and experience. This applies in particular to non-university education providers. Accordingly, it is recommended they provide information on the intended learning outcomes, workload and assessment form of their micro-credentials or micro-degrees, among other things. However, as it pertains to academia, there are specific crediting regulations at the state or university level that make it difficult for prospective students to gain an overview of their options, resulting in an increased need for guidance.

In principle, the awarding of ECTS points for micro-credentials can make it easier to credit them to study programmes. Although this criterion is by no means met by all courses, most large digital learning platforms such as edX, FutureLearn, and Coursera each have a few micro-credentials or micro-degrees in their portfolio for which credit points are awarded by the participating universities and then can be credited to full MBA programmes or master's degree programmes, for example.¹³ In the German education market, too, the few academic providers seem to focus quite consistently on creating options with their micro-degrees, at least within their own educational pathways. This also makes their offerings more attractive, as the providers usually offer qualified certificates with ECTS credit points that can then be counted towards complex study or continuing-education formats.

¹² <https://europa.eu/europass/en>

¹³ Micro-credentials are predominantly awarded four to six ECTS points, though there is not (yet) a uniform standard for this.

However, the awarding of ECTS points is not the only framework that plays an important role in the issue of crediting/recognition, especially if it is not within the educational institution from which the ECTS points were awarded. In the still-young and simultaneously heterogeneous market for micro-learning programmes, questions are increasingly being asked about the quality of offerings and providers.

1.3.2. Common understanding of quality

So far, there has been a lack of a uniform understanding of quality and terminology for micro-credentials and micro-degrees. This reinforces the existing lack of transparency within the market and makes it difficult to assess the respective programmes – both for the educators and learners themselves. Particularly in the case of cooperation programmes or franchised programmes, it is not always transparent who is actually responsible for administering the programme, assessing or issuing certificates, and which quality assurance measures are applicable.

National and international initiatives and education policymakers have therefore focussed intensively on this topic in recent years and agree broadly that existing standards and key elements of higher education should be used as a base for quality assurance for micro-learning formats. The spectrum of possible starting points and additional tools is diverse and ranges from accreditation procedures and (further) quality seals to the setting of minimum standards and formative evaluation through educational organisations or professional associations. Together, these approaches offer a great deal of potential to expand the range of micro-degrees and digital teaching/learning formats with overall quality assurance. The large number of stakeholders, initiatives and definitions present a major challenge.

Various providers of digital learning platforms have also contributed to the debate on quality assurance and standardisation of micro-learning offerings. Their activities focus on formulating criteria catalogues and recommendations for the specific design of micro-credentials. For example, in 2019, the European MOOC Consortium (EMC) published its Common Micro-credential Framework, which proposes very specific characteristics for micro-credentials and is intended to be used voluntarily. However, there is no agreement on the EMC's reference framework. In particular, the question of how detailed the individual characteristics of micro-credentials should be defined and possibly specified is disputed. Critics warn against overly restrictive frameworks, as these could prevent innovation in the education market and thus unnecessarily restrict the potential of micro-credentials (Orr et al., 2020). For this reason, various digital learning platforms are working together to progressively enhance the appropriate approaches for the European Education Area using their specific examples.

2. Micro-credentials and micro-degrees on the AI Campus

2.1 Working definition

The AI Campus currently uses the following definition of micro-credentials and micro-degrees, based on the definition of micro-degrees used by the German Rectors' Conference (German Rectors' Conference, 2020) and that for micro-credentials by UNESCO (Oliver, 2021) and the European Commission (European Commission, 2020).

Micro-credentials are digital certificates that document the acquisition of specific knowledge or skills, for example in the context of an AI Campus online course.

They each comprise four key aspects:

- Demonstration of a learning outcome/competency
- Transparent assessment
- Stand-alone value
- Quality assurance

These aspects were identified through consensus in the international debate surrounding the definition of micro-credentials (Microcredentials Working Group et al., 2021) and have been adopted as the standard by the AI Campus in order to make its micro-credentials and the micro-degrees based on them compatible and transferable. Micro-credentials on the AI Campus correspond to obtaining certificates of accomplishment (issued digitally or as a digital badge) and are subject to the following conditions: 'Achievement of at least 60% of the total score for all assessed tasks' (Mah et al., 2021).¹⁴

Micro-degrees refer to a set or aggregation of shorter, coordinated learning units (AI Campus courses, each documented with a micro-credential). Multiple AI Campus micro-credentials can be combined to form an AI Campus micro-degree. Said micro-degree is currently planned to comprise at least three AI Campus learning units (online courses) with coordinated content and micro-credentials (i.e. digital record of achievement or digital badge). The overall workload of currently 90 to 150 hours for a micro-degree is based on the proposal of the European MOOC Consortium (The European MOOC Consortium, 2019).

Figure 1
AI Campus micro-degree



Figure 1 shows a micro-degree from AI Campus.

¹⁴ Since 2021, AI Campus offers confirmations of participation (requirement: at least 50% of the learning content of an online course has been accessed) and records of achievement (requirement: at least 60% of the total score for all assessed tasks has been reached). The learners themselves can download the certificates from the LMS provided that the prerequisites are met. Records of achievement can also be shared on social media using a digital badge (Rampelt et al., 2022).

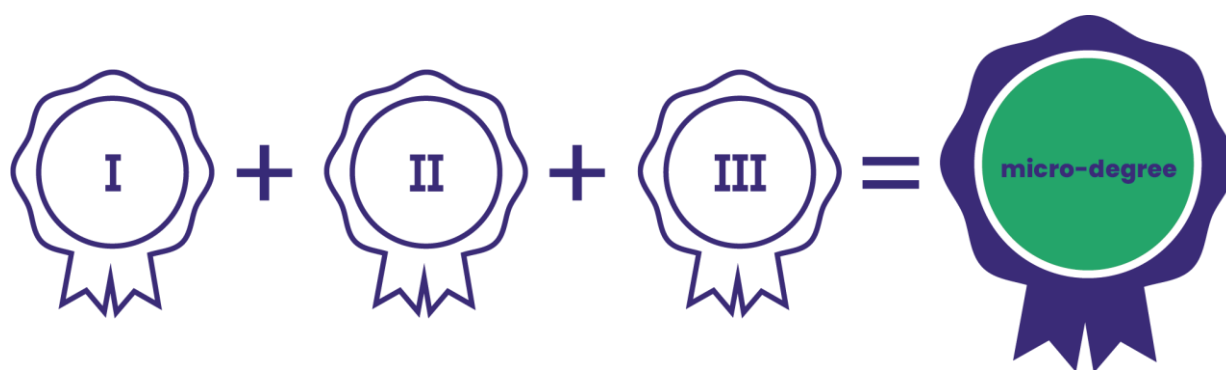
Micro-degrees may have a more informal value on the labour market or may represent a new preliminary stage to a formalised degree (bachelor's, master's).

The targeted audiences for micro-degrees on AI Campus are students, professionals and other lifelong learners, as well as – at an institutional level – higher education institutions, research institutions, and businesses.

Figure 2 depicts the aggregation of micro-credentials into a micro-degree on the AI Campus.

Figure 2

Aggregation of micro-credentials into a micro-degree on the AI Campus



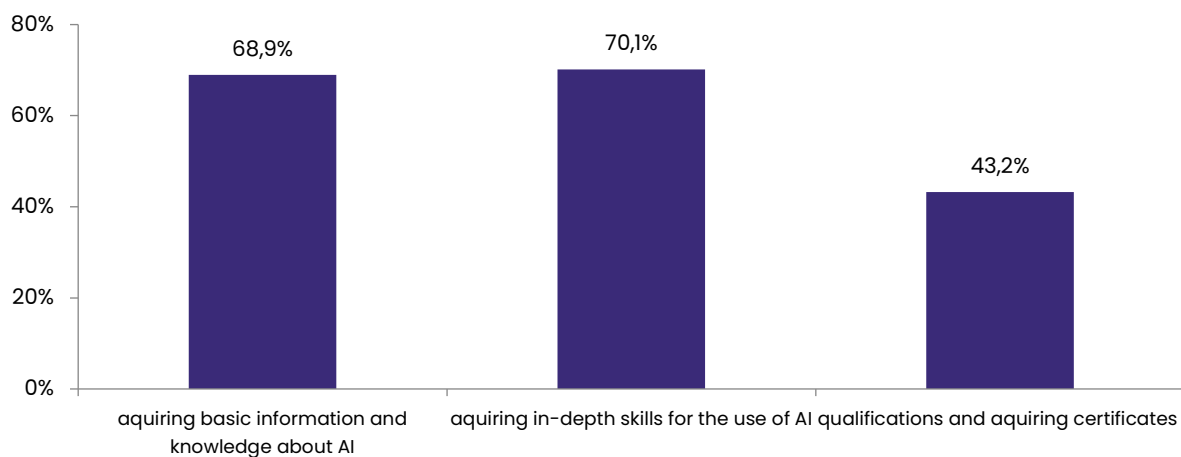
AI Campus' brief definition of micro-degrees

In its current definition of micro-degrees, the AI Campus takes into account the prevailing academic discourse (European Commission, 2020; Hochschulrektorenkonferenz, 2020; Oliver, 2021). It currently defines micro-degrees as a set or an aggregation of at least three shorter learning units (online courses) that have content coordinated with each other and cover four micro-credential criteria: demonstration of a learning outcome/competency, transparent assessment, stand-alone value, and quality assurance. All learning units (online courses) must be completed with an assessed assignment from the AI Campus (issued in digital form or as a digital badge), together forming an AI Campus micro-degree.

2.2 Current figures and requirements for certification

In spring 2022, a quantitative **online survey was carried out among AI Campus users**. The data basis was $N = 357$ people (40.3% female, age $\bar{x} = 42.8$, $SD = 14.3$). The majority of people who took part in the survey, which was conducted in German, live in Germany (90.2%).¹⁵ Most surveyed users (59.9%) work full-time (at least 35 working hours per week).¹⁶ 94.7% of the respondents were already registered on the AI Campus at the time of the survey, while the remaining 5.3% of respondents use AI Campus digital formats without registering. The first selected results in relation to the topic of 'Digital Formats for AI Campus' were presented in the 'Knowledge, Competencies and Qualifications for Artificial Intelligence. A Systematisation of Digital Formats Using the Example of AI Campus and Its Partners' discussion paper (Rampelt et al., 2022). Among other things, it showed that almost 70% of the objectives intended with the learning programmes offered by the AI Campus consist of 'acquiring basic information and knowledge about AI' (68.9%) and 'acquiring in-depth skills for the use of AI' (70.1%) (multiple answers possible). In addition, 43.2% of surveyed users indicated an objective of 'qualification and acquiring certificates' (**Figure 3**).

Figure 3
Survey on objectives for the use of AI Campus learning programmes



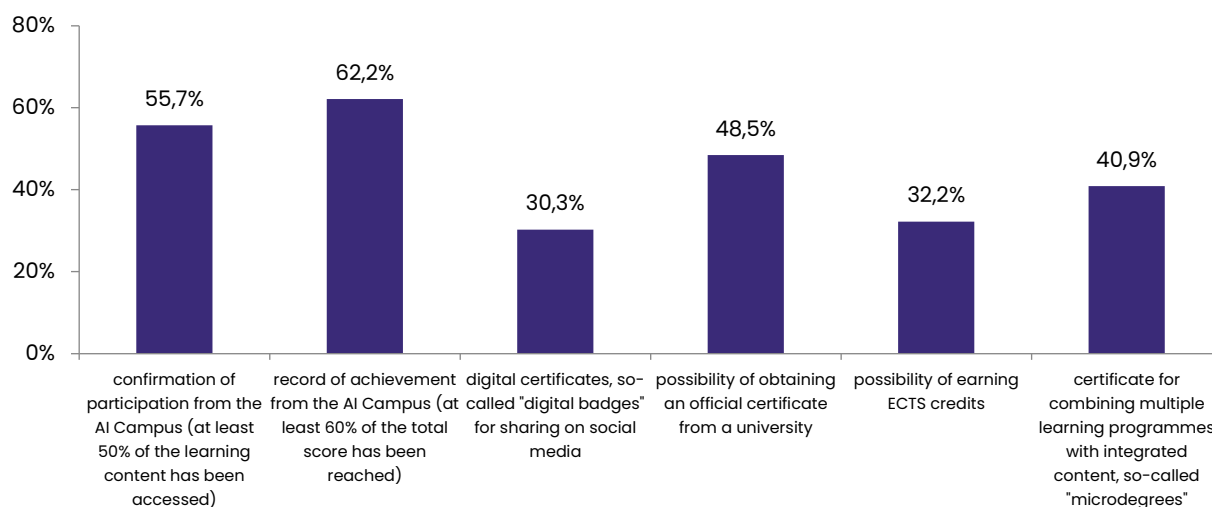
Note. $N = 338$ (registered users on AI Campus). **Question: 'What do you want to achieve with the learning programmes on AI Campus?'** (multiple answers possible). Presentation of the absolute frequency or percentage of cases (multiple answers, a total of 616 answers). The relative frequency is distributed as follows: 'acquiring basic information and knowledge about AI' (37.8%), 'acquiring in-depth skills for the use of AI' (38.5%) and 'qualification and acquiring certificates' (23.7%).

¹⁵ $N = 357$. Question 'In which country do you reside?' Answers: Germany (90.2%), Austria (3.4%), Switzerland (1.7%), Luxembourg (1.4%), others (3.4%).

¹⁶ $N = 357$. Question: 'Are you currently employed? Note: any paid or income-related activity, regardless of its duration.' Answers: 'Yes, full-time (35 hours or more per week)' (59.9%), 'Yes, part-time (15–34 hours per week)' (14.3%), 'Yes, part-time (less than 15 hours per week)' (6.4%), 'Maternity/education leave' (0.3%), 'Trainees/apprentices/retrainees' (0.6%), 'Pensioners, early retirees' (7.8%), 'Students not working for money' (4.2%), 'Jobseekers/unemployed' (2.8%) and 'I do not wish to answer' (3.6%).

In addition, a question was asked in relation to the focus topic of ‘certificates’: which certification options on the AI Campus appeal to surveyed users. **Figure 4** shows that, when multiple answers are available, respondents consider records of achievement (62.2%) and confirmation of participation (55.7%) particularly important. Interest in ‘micro-degrees’, described as a ‘certificate for the combination of multiple learning programmes with integrated content, so-called “micro-degrees”’, is indicated at a rate of 40.9%.

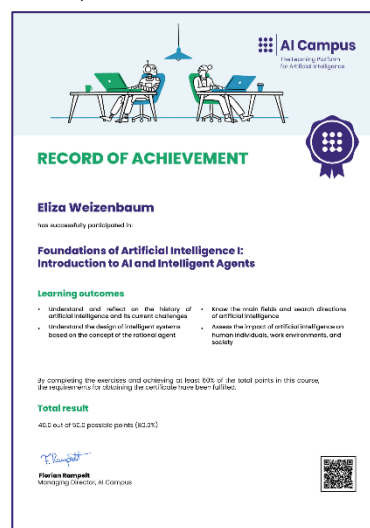
Figure 4
Survey on appealing AI Campus certification options



Note. N = 357. **Question: ‘Which certification options interest you?’** (multiple answers possible). Presentation of the absolute frequency or percentage of cases (multiple answers, a total of 963 answers). The relative frequency is distributed as follows: ‘confirmation of participation from the AI Campus’ (20.7%), ‘record of achievement from the AI Campus’ (23.1%), ‘digital certificates, so-called “digital badges” for sharing on social media’ (11.2%), ‘possibility of obtaining an official certificate from a university’ (18.0%), ‘possibility of earning ECTS credits’ (11.9%) and ‘certificate for combining multiple learning programmes with integrated content, so-called “micro-degrees”’ (15.2%).

Since 2020, AI Campus **confirmation of participation** (requirement: at least 50% of the learning content of an online course has been accessed) and, since 2021, **record of achievement** in selected online courses (requirement: at least 60% of the total score for all assessed tasks has been reached). The learners themselves can download the certificates from the LMS provided that the prerequisites are met. Records of achievement can also be shared on social media as a digital badge. In addition, records of achievement are progressively being offered for an increasing number of online courses on AI Campus.

Figure 5
Record of achievement from AI Campus



In February 2023, more than 4,600 confirmation of participation and over 1,300 records of achievement¹⁷ had been obtained by learners. Mah et al. (2021)¹⁸ describe the concept for certificates on AI Campus (as of October 2021).

In the user survey, the 'possibility of obtaining an official certificate from a university' was provided at a rate of 48.5%. An initial example of a **collaborative record of achievement** is the online course '[AILAURA – AI in the Teaching of Ophthalmology and Radiology](#)'¹⁹ at the University Hospital Bonn. AI Campus learners who have successfully completed the self-directed course with the integrated forms of assessment receive a certificate issued jointly by the AI Campus and the University of Bonn. As part of the integration of the learning programme into the AI courses at the University Hospital Bonn radiology department, on-site medical students have the opportunity to obtain two ECTS credits in interdisciplinary electives based on the record of achievement from the AI Campus and a local final examination (Rampelt et al., 2022).

2.3 Current practical developments and perspectives

Two practical examples from the AI Campus are presented below.

Example 1: 'AI_VET – AI in Vocational Education and Training'

AI_VET – AI in Vocational Education and Training²⁰ is the first series of courses on the AI Campus to be designed as a micro-degree programme. The course series comprises four online courses focussing on learning and teaching with and through artificial intelligence. 'AI-VET' was developed by the University of Mannheim and the University of Stuttgart for the AI Campus and is openly licensed as an 'AI Campus Original'. In the four online courses, students can learn at their own pace (self-paced learning); there are no fixed start, end, or submission dates. Scholastically, the assessment for the individual courses is embedded in what are known as 'goal-based scenarios'. In other words, the provided videos, featuring a cover story and a mission, familiarise the course participants with the scenario and the role they will play in it. In partial missions, participants are given the opportunity to reflect on their learning process and recap the content. The actual grading of their performance takes place during the mission reviews at the end of each stage.

¹⁷ Information from the AI Campus LMS as at 29 August 2022

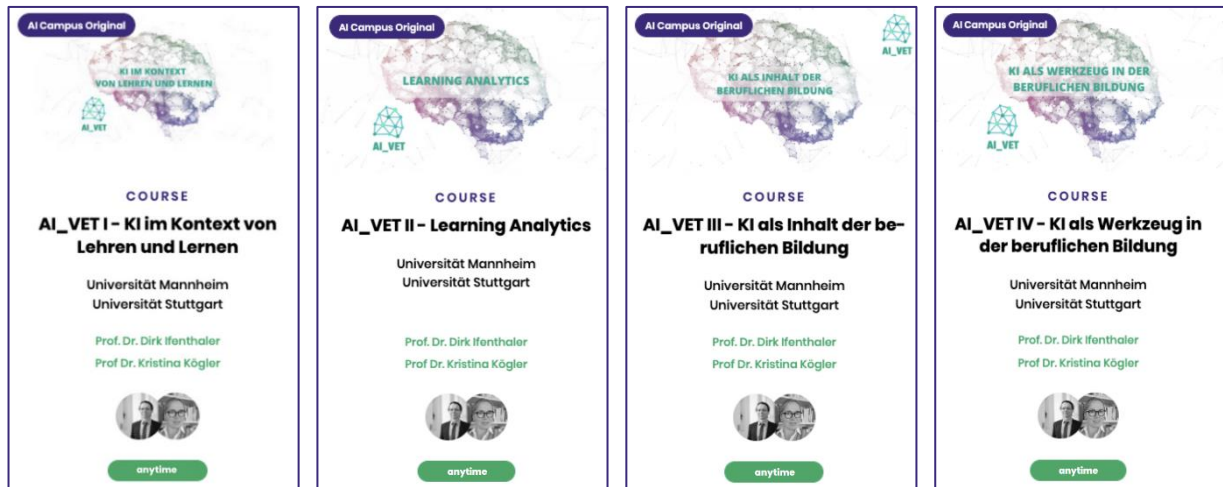
¹⁸ Blog post: [AI Campus Now Offering Record of Achievement](#)

¹⁹ Learning programme: [AI-LAURA – AI in the Teaching of Ophthalmology and Radiology](#)

²⁰ Learning programme: [AI_VET – AI in Vocational Education and Training](#)

Figure 6

The four 'AI_VET – AI in Vocational Education and Training' online courses




The individual 'AI_VET' courses on AI Campus (Figure 6) provide confirmation of participation and records of achievement – and a micro-degree after completing all four online courses. The curriculum is intended to be based on the University of Mannheim's master's degree programme in business education, while there are also plans to integrate it with the master's degree programme in technological/vocational education at the University of Stuttgart. As part of regular courses (blended learning format) at the provider institutions, plans envisage the possibility of earning ECTS credits with an additional, legally compliant face-to-face assessment.

Figure 7

Brief information about the 'AI_VET – AI in Vocational Education and Training' micro-degree

Example: 'AI_VET – AI in Vocational Education and Training'



Format: 4 online courses/micro-degree after completing all courses

Online courses:

1. 'AI_VET I – AI in the Context of Teaching and Learning' (approx. 25 hours)
2. 'AI_VET II – Learning Analytics' (approx. 50 hours)
3. 'AI_VET III – AI as Content in Vocational Education and Training' (approx. 50 hours)
4. 'AI_VET IV – AI as a Tool in Vocational Education and Training' (approx. 25 hours)

Micro-degree: 'AI in Vocational Education and Training' micro-degree on completion of all 4 online courses (approx. 150 hours)

Target audience: Everyone

Available: Anytime

Providers: University of Mannheim & University of Stuttgart

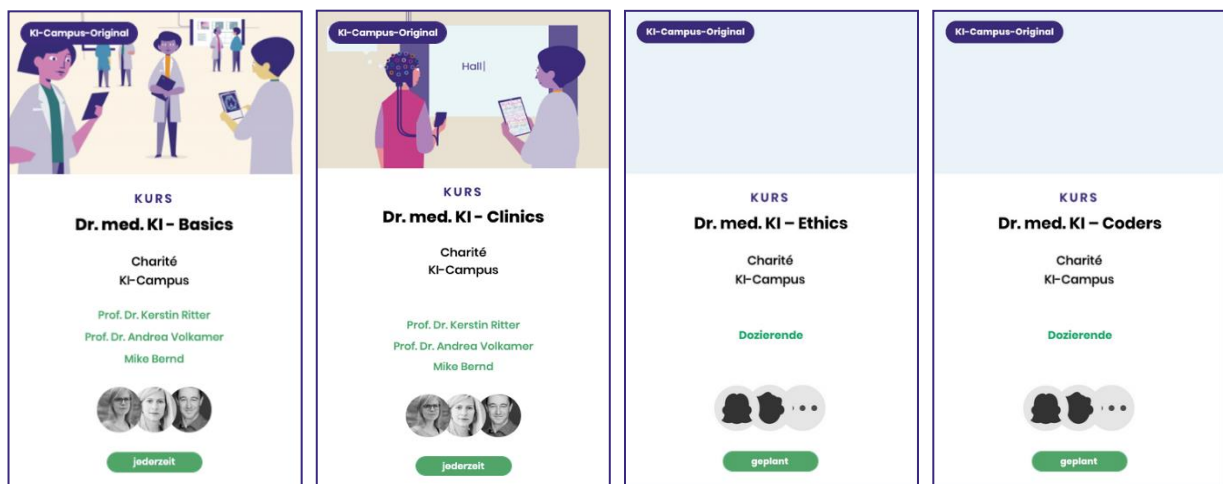
Example 2: 'Dr. med. KI'

The AI Campus is planning to develop a micro-degree programme based on the 'Dr. med. KI' (*Doctor of Medicine: AI*) course series. micro-credentials/digital badges are already available as record of achievement for '[Dr. med. KI – Basics](#)'²¹ and '[Dr. med. KI – Clinics](#)'²², the two online courses in the course series.

There are plans for two further courses, namely '[Dr. med. KI – Ethics](#)' and '[Dr. med. KI – Coders](#)', to add to the course series and turn it into a micro-degree programme (Figure 8). All learners who have successfully completed the four courses with record of achievement are intended to receive a comprehensive certificate for this purpose. The programme is planned to comprise a total workload of approximately 100 hours, with 'Dr. med. KI – Coders' in particular being the final course and the most time-consuming, as it will focus the most on developing skills at a higher taxonomic level with programming tasks and application formats.

Figure 8

The four 'Dr. med. AI' online courses



To ensure sustainable and consistent use, the courses are being progressively certified for the field of continuing medical education in collaboration with the Baden-Württemberg State Medical Association in order to integrate their curriculum with the continuing medical education system. Building on the micro-credentials from the AI Campus, doctors will be able to collect the points that they need in the context of continuing education.

²¹ Learning programme: [Dr. med. KI – Basics](#)


²² Learning programme: [Dr. med. KI – Clinics](#)

The cooperation between the Baden-Württemberg State Medical Association and the AI Campus was officially announced in August 2022.²³ The first two certified online courses are '[Dr. med. KI – Grundlagen für Ärztinnen und Ärzte](#)'²⁴ (*Doctor of Medicine: AI – Basics for Doctors*, comparable to the 'Dr. med. KI – Basics' online course) and '[Dr. med. KI – Anwendungen für Ärztinnen und Ärzte](#)'²⁵ (*Doctor of Medicine: AI – Applications for Doctors*, analogous to the 'Dr. med. KI – Clinics' online course).²⁶

Figure 9

Brief information about the planned 'Dr. med. KI' micro-degree

Example: 'Dr. med. KI'



Format: 4 online courses/micro-degree after completing all courses

Online courses:

1. 'Dr. med. KI – Basics' (approx. 21 hours)
2. 'Dr. med. KI – Clinics' (approx. 16 hours)
3. 'Dr. med. KI – Ethics' (planned, likely approx. 25 hours)
4. 'Dr. med. KI – Coders' (planned, likely approx. 40 hours)

Micro-degree: 'Dr. med. KI' micro-degree after completing all 4 online courses (approx. 100 hours)

Target audience: Everyone

Available: Anytime

Providers: Charité Berlin & AI Campus

The Leibniz AI Academy aims to develop and establish a trans-curricular and interdisciplinary micro-degree programme at the Leibniz Universität Hannover (LUH), in which students from different courses of study acquire competencies in AI. The ECTS awarded courses and specialisations will be provided fully online and openly licensed on the AI Campus²⁷.

²³ <https://www.bundesaerztekammer.de/presse/aktuelles/detail/landesaerztekammer-und-ki-campus-kooperieren> and https://www.stifterverband.org/pressemitteilungen/2022_08_10_ki-campus#:~:text=Mit%20zwei%20kostenlosen%20Online%2DKursen,med

²⁴ Learning programme: [Dr. med. KI – Grundlagen für Ärztinnen und Ärzte](#)

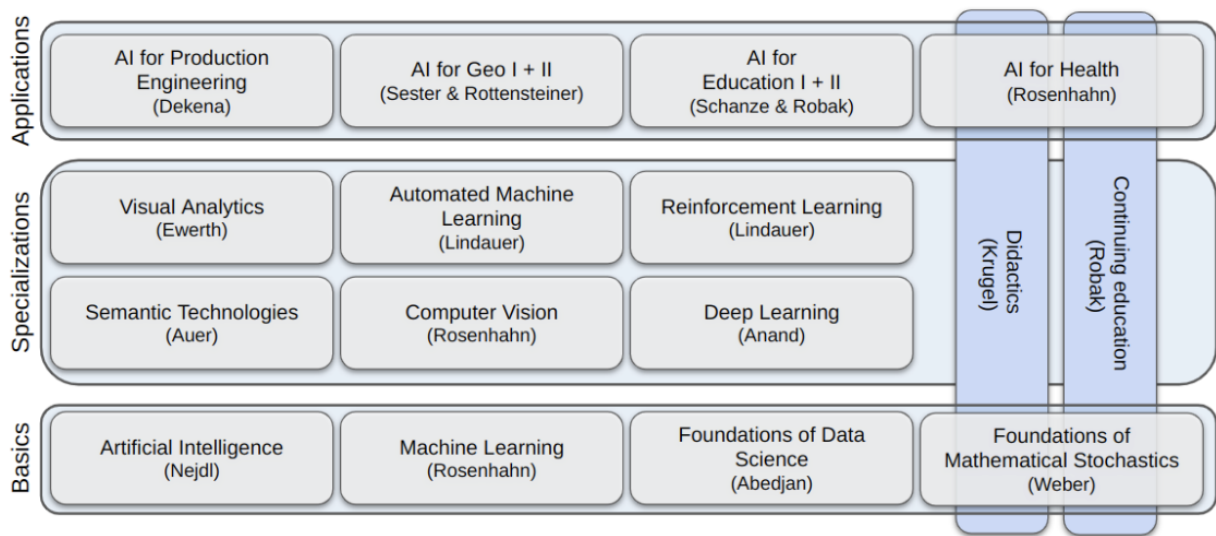
²⁵ Learning programme: [Dr. med. KI – Anwendungen für Ärztinnen und Ärzte](#)

²⁶ As part of the cooperation between the Baden-Württemberg State Medical Association and the AI Campus, two online courses have been certified: 'Dr. med. KI – Grundlagen für Ärztinnen und Ärzte' (equivalent to 'Dr. med. KI – Basics') and 'Dr. med. KI – Anwendungen für Ärztinnen und Ärzte' (equivalent to 'Dr. med. KI – Clinics'), consisting of eight and six modules, respectively. Each of the courses were developed jointly by Charité and the AI Campus and award twelve continuous professional development credits. For continuous professional development, the Baden-Württemberg State Medical Association requires 70% of the total possible score. For AI Campus, a record of achievement requires at least 60% of the total possible assessment score. The fundamental challenges of quality assurance and crediting/recognising examinations becomes clear as soon as educational providers such as the AI Campus operate in overarching quality assurance systems (in a federal system) and cooperate with other educational institutions.

²⁷ <https://www.ai-academy.uni-hannover.de/en/>

Figure 10

Micro-Degree-Programme and Specialisations from Leibniz AI Academy



3. Conclusion and Outlook

Micro-credentials and micro-degrees are already established in the international education sector. In Germany and Europe, micro-credentials and micro-degrees are increasingly being discussed as a flexible form of qualification (European Commission, 2020; Hochschulrektorenkonferenz, 2020). For example, the German government wants to examine the introduction of micro-degrees for further academic education (SPD et al., 2021). There are challenges, such as those related to a uniform understanding of the term and issues in connection with recognition/crediting, while promising potential also exists.

The AI Campus aims to play an active role in shaping the national and European discourse on micro-credentials and micro-degrees. The purpose of this discussion paper is to provide an initial insight into current and planned AI Campus micro-degree programmes, with two examples of practical applications from the AI Campus. The development of micro-degree programmes on AI Campus is based on initial preliminary work. It is connected with the enhancement and application of overarching concepts for digital proof of education, a framework of clear criteria for micro-degrees and quality assurance for them for and on AI Campus. In addition, the aim is to test AI Campus micro-degrees in an application-oriented manner for continuing and further education, key competency areas and fields of specialisation at universities, and lifelong learning. The pilot phase is to be accompanied by an evaluation that addresses issues such as the practical implementation of theoretical frameworks and the acceptance of micro-degrees among different audiences. In addition, the AI Campus also intends to address technical issues, particularly with regard to the combinability/stackability of its micro-degree programme courses and the issuing and obtainment of digital certificates.

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www.ai-campus.org

