Analysis 2 – Comparative analysis of school plans

Content

Description of the functioning of the pedagogical education system. How to become a teacher?

Czech Republic	Austria
The system of teacher education is based on the implementation of accredited study programs carried out in undergraduate or postgraduate studies (further education of teaching staff). The length of the study, its structure and the level of education achieved correspond to the legislative requirements for teacher qualifications established for individual levels of schools.	In Austria, teacher training takes place at public universities and pedagogical colleges. Until a few years ago, these institutions were subordinated to various ministries. Pedagogical higher schools were subordinated to the Ministry of Education, which is also responsible for schools, while universities were subordinated to the Ministry of Science.
In undergraduate education, the preparation of teachers for kindergartens is implemented through a bachelor's study program, the preparation of teachers for the 1st level of elementary schools is an unstructured five-year master's study, and the qualification of teachers for the 2nd level of elementary schools and for secondary schools is implemented through a structured study, i.e. completing a bachelor's and subsequent master's degree. The standards of study programs are set by the framework requirements of the regulator of the teaching profession, which is the Ministry of Education, Youth and Sports (MŠMT). These standards determine the proportion of subjects of theoretical (specialist) training, subjects of a didactic focus, subjects of the pedagogical-psychological component and observations from practice.[1]	Teacher training has been fundamentally reformed in recent years since 2009 as part of the "new teacher training" process (PädagogInnenbildung NEU 3).

The " PädagogInnenbildung NEU" initiative was also important because there is an acute need for more teaching staff in Austria. Another goal was to standardize and unify the education of all pedagogues based on the Bologna structure. In addition, this process should ensure that the new system offers a high degree of permeability for new teachers and offers us the possibility of combined higher education, especially master's. Thanks to this initiative, the cooperation between pedagogical colleges and universities, which did not take place until now, was also accelerated, and thus the alignment of courses, teaching, centers of interest and study plans was made possible.

Education was centrally reorganized and education that previously took place separately in universities or pedagogical colleges was standardized and merged into clusters. |
| In the system of postgraduate training, the starting point is the connection of already completed university training with a study in the field of pedagogical sciences or an additional pedagogical study. In the case of the qualification of teachers for kindergartens and for the 1st grade of elementary school, the condition for admission to study is the completion of a previous university degree in teaching or pedagogical programs. In this system, the qualification of a 2nd grade primary and secondary school teacher is based on the de facto recognition of any focus of previous higher education. The structure of the study program then consists in the preparation of participants in a shortened model in topics focused on didactic, pedagogical-psychological areas and on observations from practice. The preparation of study programs is governed by the Study Standards in the field of pedagogical sciences for obtaining a teaching qualification (DPS).[2] | There are a total of four different networks for teacher education (Entwicklungsverbünde) (West, Central, Southeast, Northeast). Within these collaborative networks (also called clusters), university teaching schools and universities offer new teacher training programs at tertiary level in close cooperation with each other.[4] |
| If we wanted to characterize the optimal way to "become a teacher", we would prefer long-term undergraduate training with an emphasis on connecting the theoretical and practical | **Institution for teacher education in Upper Austria**

Relevant for Upper Austria is the Network Center for Teacher Training (see also here https://www.lehrerin-werden.at/), which consists of the following institutions: |
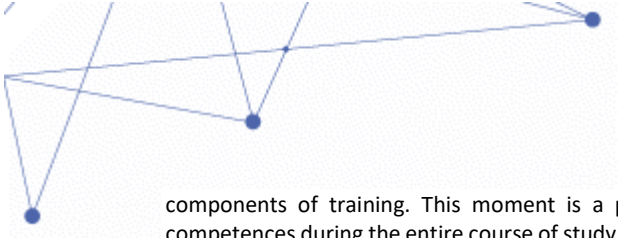
[1]Framework requirements for study programs, the completion of which provides a professional qualification for exercising regulated authorizations for teaching staff, https://www.msmt.cz/vzdelavani/vysoke-skolstvi/ramcove-pozadavky-na-studijni-programy-jejichz-absolvovanim-1 .

[2]Standard of study in the field of pedagogical sciences for obtaining the qualification of a teacher of the 2nd grade of primary and secondary schools, file:///C:/Users/Fyzika/Downloads/standard_DPS-1%20(1).pdf

[3] https://www.bmbwf.gv.at/Themen/schule/fpp/aJU/pbneu.html

[4] https://studyinaustria.at/en/study/institutions/university-colleges-of-teacher-education

components of training. This moment is a prerequisite for the formation of the teacher's competences during the entire course of study as a reflective practitioner who is able to perceive what is happening in the educational process, how the learning processes of his pupils are taking place and what results he achieves in his educational work. The key to professional success and the initiation of lifelong growth is to internalize the knowledge imparted so that it becomes part of the professional belief, and to replace (but not completely eliminate) intuition and improvisation with a reflective and thoughtful approach.

- Private Anton Bruckner University
- Johannes Kepler University in Linz
- Private university of pedagogy, Diocese of Linz
- Private Catholic University, Linz
- Edith Stein Church Pedagogical University
- University of Pedagogy in Upper Austria
- Zweig College of Education , Salzburg
- Paris Lodron University in Salzburg
- University of Art and Industrial Design, Linz
- Mozarteum University , Salzburg

In this cluster, the main providers of teacher education and further education are the following institutions:
- Private university of pedagogy, Diocese of Linz
- University of Pedagogy in Upper Austria
- Zweig College of Education , Salzburg

Teachers of general education subjects at the 2nd level of elementary schools are now being educated in teacher's courses at universities and higher education schools.
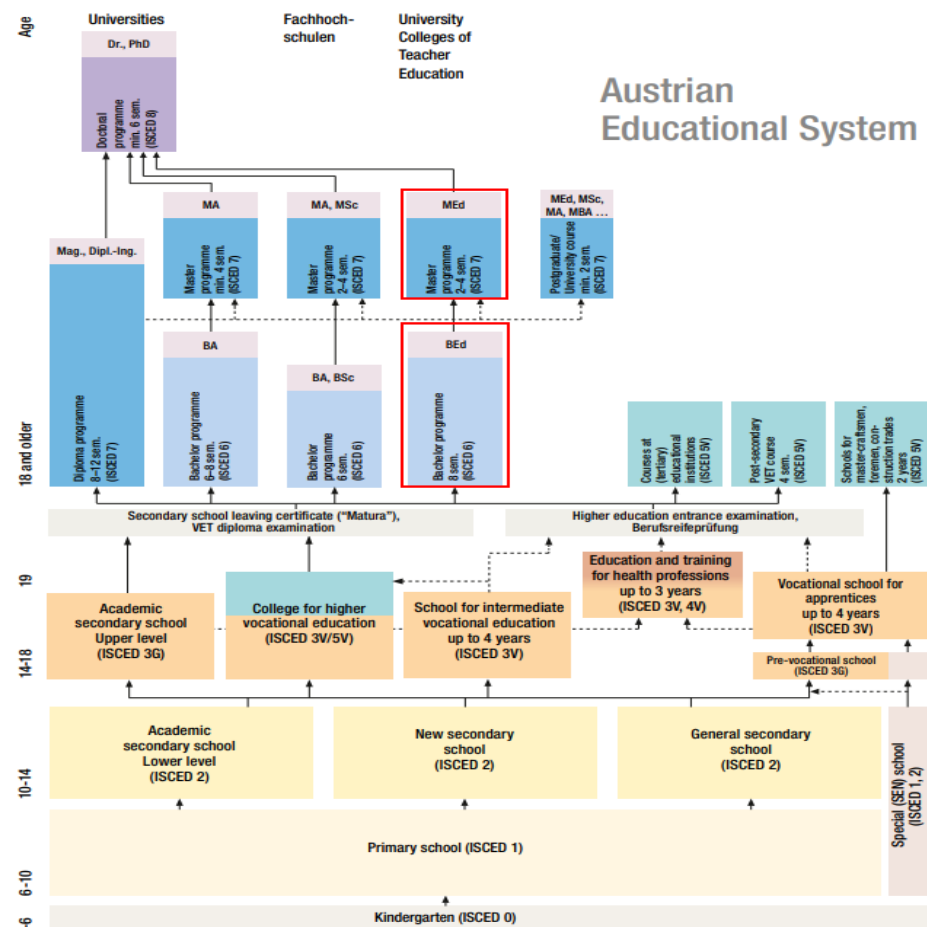
Teacher courses for both primary and secondary levels of vocational schools take place exclusively at higher pedagogic schools.

In addition, the structure of teacher education has changed and now consists of a four-year bachelor's degree, which can be followed by a master's degree of at least one or two years [5]:

Austrian Educational System

How are study plans and accreditations created?

Czech Republic	Austria
The right to implement a study program (admit students, teach, issue a diploma and a supplement to the diploma) arises on the basis of institutional or program accreditation of the study program.	**Curriculum for the Bachelor of Secondary Education (General Education) and Curriculum for the Master of Secondary Education (General Education)**

The right to implement a study program (admit students, teach, issue a diploma and a supplement to the diploma) arises on the basis of institutional or program accreditation of the study program.

The Council of the National Accreditation Office for Higher Education granted institutional accreditation to the only higher education institution in the South Bohemian Region – the University of South Bohemia in České Budějovice (JU) for the field of study in Teaching. This means that the higher education institution accredits study programs in the given field of education within its internal procedures and rules.

In addition to Act No. 111/1998 Coll., on universities and on the amendment and addition of other laws (the Act on Universities), as amended, there are minimum requirements for the quality of educational activities, resp. provision of the study program, established by Government Regulation No. 274/2016 Coll., on standards for accreditation in higher education and Government Regulation No. 275/2016 Coll., on areas of education in higher education, evaluation conclusions, recommended procedures and methods for evaluating the activities of the National of the Accreditation Office for Higher Education (NAÚ) as the main guarantor of the external evaluation of JU and the higher education environment in the Czech Republic in general, the JU statute, the Habilitation Regulations and the Order for the Appointment of Professors at JU, the Study and Examination Regulations of JU, the Rules of the Educational, Creative Quality Assurance System and related activities and Internal evaluation of the quality of educational, creative and related activities of JU (Rules), Standards for accreditation and realization of study programs of JU and related internal standards of JU and individual faculties.

The authorization to carry out a study program for a given type (bachelor's, master's, doctorate), form (full-time, combined or distance learning), standard duration of study and language of instruction is granted to one or more faculties by the JU Internal Evaluation Council based on a proposal by the dean or a joint proposal by the deans of the faculties until the end of the validity of the JU's institutional accreditation or for a period of 10 years.

The procedure for submitting, discussing and approving study programs, intentions to submit an application for accreditation, extension of accreditation or extension of the validity period of accreditation of study programs, intentions to submit an application for institutional accreditation of an area or areas of education and for extension of institutional accreditation of

Curriculum for the Bachelor of Secondary Education (General Education) and Curriculum for the Master of Secondary Education (General Education)

The curricula of bachelor's and master's programs are developed, coordinated and implemented in the relevant cluster of universities or educational institutions. This process takes several years because the curricula of all subjects and all studies must be coordinated centrally within these institutions.

The legal basis of the curriculum is the federal laws, which determine the scope and scope, as well as the implementation and implementation of the study.

Specifically, the legal basis for the bachelor's degree in teaching for secondary schools (general education) [8] and for the master's degree in teaching for secondary schools (general education) [9] are the following laws and study regulations of decrees based on these laws in the currently valid wording:
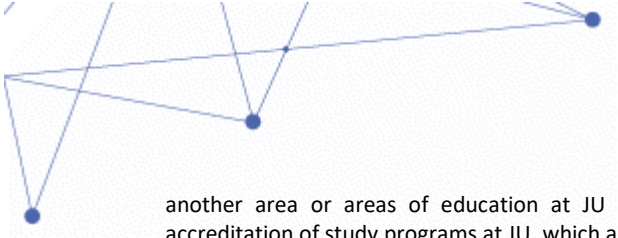
- Bundesgesetz über dies Organization of Universities and hey Studien (Federal Act on the Organization of Universities and Their Studies) (UG 2002)
- Hochschulgesetz (Higher Education Act) (HG 2005)
- Privatuniversitätengesetz (Private Universities Act) (PUG)
- Hochschul-Qualitätssicherungsgesetz (Higher Education Quality Assurance Act) (HS-QSG)
- Dienstrechts-Novelle 2013 – Pädagogischer Dienst (Amendment to the Service Act 2013 – Teaching Service)

The implementation is also regulated by law: The study is established and implemented jointly in the development association "Network Center for Teacher Education" with all participating institutions in accordance with § 54e UG and § 39b HG.

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[8] https://www.lehrerin-werden.at/fileadmin/user_upload/pdf/Bachelorstudium_Lehramt_Allgemeinbildung.pdf
[9] https://www.lehrerin-werden.at/fileadmin/user_upload/pdf/Masterstudium_Lehramt_Allgemeinbildung.pdf

another area or areas of education at JU are generally established in the Standards for accreditation of study programs at JU, which are part of the internal regulation, the Rules of the educational, creative and related activities quality assurance system and the Internal Evaluation of the quality of educational, creative and related activities of JU.[6]

The detailed procedure for the preparation and approval of study programs within the field or fields of education for which the JU was granted institutional accreditation, as well as for the preparation and approval of other study programs, is set out in the Standards for the Accreditation and Implementation of the Study Programs of the JU.[7]
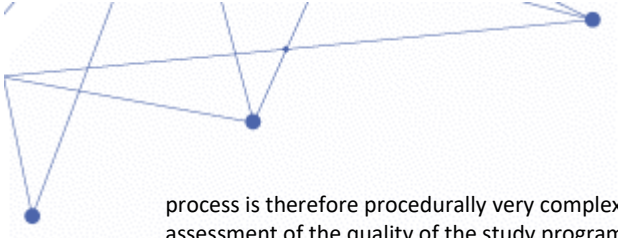
In accordance with the Rules, a study program guarantor is appointed for each study program carried out at JU and a Study Program Council is established. Their task is to take care of the quality of the study program, to submit ideas for possible improvement of the teaching of individual subjects and to modify study plans.

In the case of the creation of study plans for teaching disciplines, the above-mentioned framework requirements of the regulator (MŠMT) are the starting point as a standard for a regulated profession, expressing an opinion on ensuring quality professional training of teachers by determining the optimal proportion between the so-called disciplinary, disciplinary-didactic, pedagogic-psychological component of preparation and practice. The preparation of the study plan is organized and ideologically supported by the guarantor of the study program. It proposes the structure of individual fields and their staffing so that it is in accordance with the stated standard, but also with the profile of the graduate of the study program. In terms of staffing, the guarantor consolidates the staffing of the fields with the opinions of the heads of departments or institutes so that, on the one hand, the capacities of specific workplaces are used, and on the other hand, the qualification and professional requirements for the guarantors of the fields of theoretical and profiling basis are observed. The created draft of the study program (with a defined structure of individual subjects, their staffing and a presentation of the graduate's profile) is discussed by the faculty management and then forwarded to the scientific council of the faculty for expert discussion. After incorporating the comments in the faculty's internal evaluation, the document is assessed by the university - the Council for Internal Evaluation. By approving and incorporating any comments, space is created for the preparation of a complete accreditation file and for its re-discussion both at the faculty level (Council of Study Programs, Faculty Scientific Council and Faculty Academic Senate) and at the university level. Depending on the nature of the accreditation (institutional or programmatic), the accreditation process is terminated either by the opinion of the Council for Internal Evaluation, or the material is forwarded to the National Accreditation Office for Higher Education. The entire accreditation

[6]Rules of the educational, creative and related activities quality assurance system and internal quality assessment of the educational, creative and related activities of the University of South Bohemia in České Budějovice, https://old.jcu.cz/o-univerzite/dokumenty/internal_doc/pravidla-systemu-ensuring-the-quality-of-educational-creators-and-their-related-activities-and-internal-evaluation-of-the-quality-of-educational-creators-and-their-related-activities-ju-v-cb
[7]Standards for accreditation and implementation of study programs of the University of South Bohemia in České Budějovice, https://old.jcu.cz/o-univerzite/dokumenty/rectors_proceedings/platna-opatreni/2019/r_410_standardy_ studijnich_programu.pdf

process is therefore procedurally very complex, it includes several levels of decision-making and assessment of the quality of the study program proposal.

Study in the field of lifelong learning

The Center for Further Education of Pedagogical Staff was established at the Faculty of Education of the University of South Bohemia in České Budějovice for accreditation, organization and provision of studies in the field of lifelong learning. The center's staff prepared the accreditation of additional pedagogical studies, the completion of which can be used to obtain a teacher's qualification. The study program has its guarantor, who created the application for accreditation. It was discussed in the faculty's committees and after the approval of the faculty's management, it was sent to the Ministry of Education, Youth and Sports.

Additional pedagogical studies – B7501

This is a study to meet the qualification requirements in the field of pedagogical sciences according to § 2 of Decree No. 317/2005 Coll., on the further education of teaching staff, the accreditation commission and the career system of teaching staff, as amended. This is a study in the field of pedagogical sciences to obtain the qualification of a teacher of the 2nd grade of elementary school and secondary school of a general education or professional subject, which corresponds to the nature of the previous study. The program is accredited by the Ministry of Education, Youth and Sports in the system of further education of teaching staff.

The target group is graduates of an accredited master's degree program with a non-teaching focus (Mgr., Ing. - including graduates of linguistic fields), which corresponds to the nature of one of the subjects taught in primary or secondary school. Thanks to this study, they will acquire the competence to teach general education or professional subjects. Teaching takes place in three semesters with a time allowance of 254 hours in face-to-face and distance learning.

How can changes be made?

Czech Republic	Austria
Undergraduate studies	

Czech Republic

Undergraduate studies

If there are any changes in the accredited study program during the validity of the accreditation, it must always be with the consent of the study program guarantor and after discussion in the Study Program Council. The quality coordinator at the relevant faculty must also be informed about these changes immediately. If it is a fundamental change, the JU Internal Evaluation Council must also be informed immediately.

There is no need to discuss changes in the accredited study program at the level of the parameters of a specific subject or a change in the current offer of mandatory-elective or optional subjects with the Internal Evaluation Council of JU; these are fully within the competence of the faculty's bodies established for quality assessment (Council of study programs or Doctoral Council, or the Faculty's Accreditation Commission). The quality coordinator of the faculty informs the vice-chairman of the Internal Evaluation Council about other changes in the study program approved in the faculty's bodies established for quality evaluation, who submits an overview of the changes to the Internal Evaluation Council as information at least once a year. The Internal Evaluation Board assesses whether significant changes in the implementation of the study program, of which it is informed, will not cause the study program to cease to meet the relevant requirements. In such a case, it is entitled to reject the change and request a return to the original state, request adjustments to these changes or make other changes that will again achieve the fulfillment of the relevant requirement within the specified period.

Study in the field of lifelong learning

Minor adjustments to the study program are the responsibility of the study program guarantor. If these are fundamental changes, they must be reported to the Ministry of Education, Youth and Sports as an accreditation body in the mode of application for the extension of the educational program.[10]

Austria

Therefore, changes in the curriculum can only be made in accordance with the relevant applicable legislation and in coordination with all institutions represented in the cluster(s) and approved by the relevant ministry.

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[10]https://www.msmt.cz/vzdelavani/dalsi-vzdelavani/prodlouzeni-akreditace-vzdelavaciho-programu

Do the current curricula of future educators already contain some elements of virtual and augmented reality?

Czech Republic	Austria
Within the study plans in the case of study programs in the field of *Teacher Training,* the Faculty of Education of JU offers the subject Technology in *Education,* which is common to all students of all study programs. The aim of the subject is to practically familiarize students with the possibilities of computer technology in the work of teachers and to equip them with the skills and competences of future teachers for the creation of teaching materials of a multimedia and interactive nature. Here, students are regularly introduced to both VR and AR. Students' iPads or smartphones are most often used to familiarize themselves with augmented reality. A 3D lab with two HTC Vive headsets is used to demonstrate VR . Due to the small capacity of the classrooms, the technology and the time allowance, the students really only get to know the technology and there is no room to go more in-depth.	These curricula describe very precisely the relevant subjects, the relevant modules, the objectives, the subjects and examinations they contain, as well as the prerequisites for participation in all subjects taught during the course of study.

The undergraduate curriculum [11]does not yet contain any reference to virtual or augmented reality.

description of the subject media design (Mediengestaltung ; p. 380 ff.) in which "virtuality and immersion" are mentioned. However, media design is simply offered in special types of schools with a focus on media in the curriculum.

The terms virtual reality or augmented reality do not even appear in the Master's curriculum [12]. Virtual spaces (... "presentation in real and virtual spaces", p. 170) can again be found as a term in the subject of media design.

In general, it should be noted that the names of technologies are rarely found in the curriculum. Taking the bachelor's curriculum as an example, the word "tablet" or "notebook" does not appear in it at all, the word "computer" is mentioned 28 times and the name "new media" occurs 24 times, the term "new technologies" occurs twice.

Other specific examples of VR/AR implementation possibilities in specific specializations (approval)

Mathematics

Stereometry: 3D space simulation and VR dynamics enable the recognition and detection of properties of three-dimensional objects and shapes. VR brings the possibility of direct interaction with the geometric properties of objects and it is convenient to combine it with physical models. The ability to create a virtual environment of geometric shapes with which the user can interact is beneficial for the development of pupils and students' ability to perceive three-dimensional space.

Financial mathematics: VR offers the possibility to simulate situations that develop and test the financial literacy of pupils and students. This option is now widely used by financial institutions to train their employees.

Physics

In physics, VR and AR undoubtedly have great educational potential. It involves both the implementation of virtual experiments and learning about phenomena and places that are

More specifically, these concepts are mentioned in the descriptions of the following curricula:

- History and Social Sciences/Political Education
- Design/Industrial Art
- IT and IT management
- Music
- Instrumental music education
- Mathematics
- Media design
- Inclusive education/focus on the disadvantaged
- English
- Nutrition and household

Now it may seem surprising why there are so few technological or technological terms in teacher education curricula.

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[11] https://www.lehrerin-werden.at/fileadmin/user_upload/pdf/Bachelorstudium_Lehramt_Allgemeinbildung.pdf
[12] https://www.lehrerin-werden.at/fileadmin/user_upload/pdf/Masterstudium_Lehramt_Allgemeinbildung.pdf

difficult for ordinary people to access, e.g. the universe, a particle accelerator, curved space, microscopic phenomena in matter related to the phenomena that pupils learn about , etc.

Technical education

VR and AR already play an important role in technical practice. It is mainly about preparation and training of complex production or service operations. However, the use of VR for 3D modeling of three-dimensional objects or environments is also real, whether it is design in the field of structures, residential architecture or the automotive industry. For the preparation of students in this field, the use of VR and AR is offered for virtual tours of any machines or equipment or entire production lines.

Geography

The possibility of including modern technologies, such as GIS, VR, AR, etc., in the teaching of geography in the 2nd grade of primary schools is very important. This is already a specific didactic application of the given field. This subject follows the teaching of geography for the 2nd grade of elementary school. If we go into details, then almost every subject within geography can be used for these technologies. Especially when preparing materials for teaching, understanding a more complex issue or getting to know a certain region.

Language teaching

For teaching English, German or Russian, it would be difficult to find any specific elements for VR or AR. However, even these technologies can be involved, especially in cooperation with geography, since the curriculum includes the realities of Canada, Ireland, German-speaking countries, Russia, etc. The aim of this course is to familiarize students with the basic geographical, cultural, social and political aspects of life in different countries with an emphasis on the practical use of this knowledge. During the lectures, students gradually become familiar with geographical areas (Great Britain and its smaller units, USA, Australia, Canada, former colonies, Germany, Austria, Switzerland, Russia, etc.) and work with texts, visual and audiovisual materials that they can also use during own teaching.

Natural history

In the bachelor's study program, the use of virtual (VR) or augmented (AR) reality is offered as part of the preparation of science teachers in the following subjects: Cellular and molecular

digi.kompP – DIGITALE KOMPETENZEN FÜR PÄDAGOGiNNEN
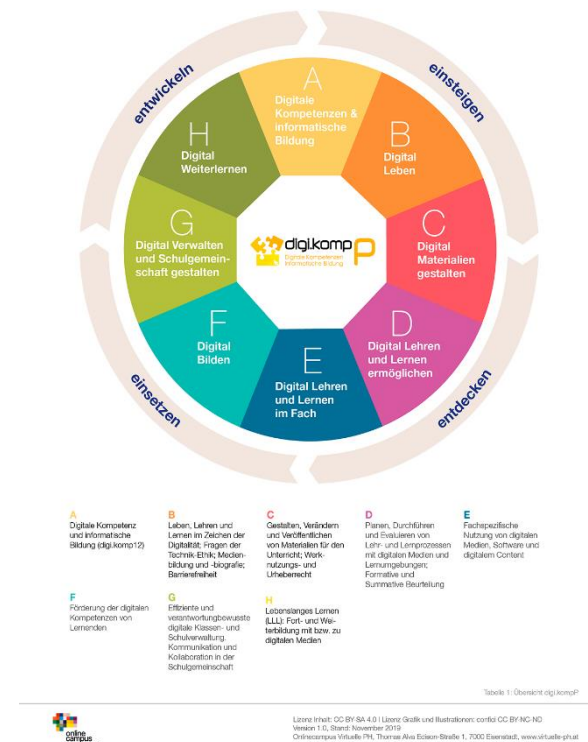
Competence model digi.kompP

It is necessary to know that in Austria there is a separate concept of digital competences for educators, namely " digi.kompP [1314]". This digital competence model was developed in the first version in 2016 and the second version was further developed in 2019. Image source: https://www.virtuelle-ph.at/wp-content/uploads/2020/02/Grafik_Gesamt-web .png

This competency model for educators is based on national and international models. It is a system for the self-evaluation of the continuous professional development of pedagogues and is also

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[13] https://www.virtuelle-ph.at/digikomp/
[14] https://www.virtuelle-ph.at/wp-content/uploads/2021/04/Grafik-und-Deskriptoren_Langfassung_adapt-2021.pdf

biology; Biology of viruses and unicellular organisms in the context of the school curriculum; Geology I. and II. and Functional Human Anatomy. In cell and virus biology, VR and AR can be used to show students structures that are microscopic and generally difficult to imagine. In the case of geological subjects, students could familiarize themselves with the manifestations of internal or external geological factors through VR and AR. Human anatomy is generally a very suitable topic for the use of VR and AR, as it will provide an opportunity to gain insight into the structure of the human body, the relative position of individual organs, their actual shape or size, etc. In subsequent studies, it would be possible to use VR and AR in the subjects of Physiology I and II., because they represent complex physiological processes from botany and zoology. VR and AR would certainly increase the clarity of the presented processes.

All these areas where VR and AR could be used are quite problematic even in the teaching of natural history in elementary school. A student who would encounter them as part of his bachelor's preparation could subsequently use them in his pedagogical practice and use them to convey the curriculum to pupils in elementary school.

Chemistry

As part of the bachelor's program for the preparation of chemistry teachers, there is the possibility of using VR and AR in the following subjects: Didactics of school experiments and Laboratory technique of chemical experiments. In the follow-up master's study, VR and AR can suitably supplement the teaching of the subject Basics of chemical technologies. In all these subjects, students may encounter more complex technological processes, laboratory procedures or tools that are not commonly available in laboratories at the university or are not used by any company in the area. VR and AR can help in the education of teachers (and subsequently in a very simplified form in the teaching of elementary school students) with a better illustration of chemical processes, such as substitution and elimination reactions in organic chemistry or the distribution of valence electrons in orbitals. When VR or AR is implemented in laboratory procedures, fine motor skills and work habits in conducting experiments can also be developed in this way.

Art Education

Within the framework of art education, it is very appropriate to use VR/AR, for example, in the so-called mediation of architecture, when the 3D model of the building enables a comprehensive and comprehensible interpretation of the principles of construction. It is also possible to work with the visualization of sculptural works for the possibility of a full spatial perception of the sculptural work.

used to categorize further education events in the field of digital competences at teacher training universities.

This competency model " digi.kompP " is mentioned 143 times in the curriculum for undergraduate students, which means that this competency model is already used in a wide range of professional education courses. In addition, the digi.kompP competency model is mentioned 54 times in the master's curriculum.

The competence model " digi.kompP " for educators consists of 8 sub-areas:

- **Category A (= digi.komp 12)** – **Digital skills and education in the field of IT**
  This subfield is the basis for starting education at a university of education, specifically the digi.komp12 competence model (see https://digikomp.at/?id =585), which must be mastered at universities.
- **Category B – Digital life**
  Life , teaching and learning in the sign of digitality ; Technical ethics issues; Media education and biography; Accessibility
- **Category C - Creation of digital materials**
  Creation, editing and publishing of teaching materials; Right of Use and Copyright
- **Category D - Enabling digital teaching and learning**
  Planning, implementation and evaluation of teaching and learning processes using digital media and learning environments; formative and summative assessment
- **Category E - Digital teaching and learning in specialist areas**
  Specific use of digital media, software and digital content
- **Category F – Digital education**
  Promoting students' digital skills
- **Category G – Digital management and formation of the school community**
  Effective and responsible digital classroom and school management; communication and cooperation in the school community
- **Category H - Further digital learning**
  Lifelong learning (LLL): Further and advanced learning with or on digital media

If we now look more closely at the model of digital competences for teachers (see https://www.virtuelle-ph.at/wp-content/uploads/2021/04/Grafik-und-Deskriptoren_Langfassung_adapt-2021.pdf), however, again he doesn't use many technical terms: virtual and augmented reality, as well as tablet and laptop are again searched in vain, computers are mentioned three times.

Here too, neutral formulations such as digital media, digital tools, software, etc. were chosen, which describe the competences in such a way that they can be used independently of technology.

Teaching for the 1st grade of elementary school

Areas focused on the study of nature offer the use of VR and AR in the subjects Man and his world I. - Inanimate nature and Methodology of natural science experiments, Man and his world II. – Living nature and Didactics of learning about nature, Natural science research and work with natural resources and Regional natural science. VR and AR offer the possibility to demonstrate more complex experiments (again together with the development of fine motor skills and mastery of work procedures) or to visit different habitats where students (and therefore pupils) cannot easily get to, or to observe animals and their behavior. In Regional Natural Sciences, students (and pupils) could get to know localities in their surroundings without the need for complicated travel to the given locality, or it would be possible to present materials in direct connection with the curriculum (without the need to follow the seasonal aspect).

Teaching practice

In general, it is possible to consider the use of virtual reality as part of the continuous practice of teaching students, where students could become familiar with interesting moments in the classroom and propose their own solution to the pedagogical situation (in this case, however, long-term preparation will be necessary, including making recordings and creating an adequate virtual environment) .

Virtual or augmented reality can be interpreted in this model in several categories [15]:

Taking category D "Enabling digital teaching and learning" as an example, item D.13 (page 14) ("I can search for or select new applications and software for teaching" or "use them in teaching" and "think critically") can clearly be used when working with virtual or augmented reality:

...

Category E "Digital teaching and learning in professional areas" also fits very well here, for example competences E.7 and E.9 (p. 17) with basic skills such as "I can find/select new applications for teaching and learning", which extend to "I can try/use new teaching and learning applications" or "I can learn to use/implement new teaching and learning applications" and finally end with the competency "I can use/adapt new teaching and learning applications and evaluate their strengths and weaknesses':

...

15 https://www.virtuelle-ph.at/wp-content/uploads/2021/04/Grafik-und-Deskriptoren_Langfassung_adapt-2021.pdf

...

In addition, AR/VR fits very well into Section D.12 (page 18), where current trends and developments in media-based teaching and learning for self-directed learning are identified, described, adapted and evaluated:

Ich kann aktuelle Trends und Entwicklungen zum mediengestützten Lehren und Lernen identifizieren.	Ich kann aktuelle Trends und Entwicklungen zum mediengestützten Lehren und Lernen im eigenen Unterrichtsfach beschreiben.	Ich kann aktuelle Trends und Entwicklungen zum mediengestützten Lehren und Lernen für meine Lehrtätigkeit anpassen.	Ich kann aktuelle Trends und Entwicklungen zum mediengestützten Lehren und Lernen evaluieren.
E.12.1.	E.12.2.	E.12.3.	E.12.4.

Furthermore, in category H "Further digital education" you will find corresponding formulations of competences, e.g. in point H.11 "I can search for and find meaningful and beneficial content of software and media for educational or didactic purposes or evaluate or reflect on it independently and in accordance with the law or use".

Kategorie H - Digital Weiterlernen

Lebenslanges Lernen (LLL): Fort- und Weiterbildung mit bzw. zu digitalen Medien

...

Ich kann für pädagogische bzw. didaktische Zwecke sinnvollen und förderlichen Content, Software und Medien suchen, und finden.	Ich kann für pädagogische bzw. didaktische Zwecke sinnvollen und förderlichen Content, Software und Medien suchen, finden und bewerten.	Ich kann für pädagogische bzw. didaktische Zwecke sinnvollen und förderlichen Content, Software und Medien suchen, finden, bewerten und reflektieren.	Ich kan didakti förderl Medie reflekti verwer lernen.
H.11.1.	H.11.2.	H.11.3.	

What would be a possible procedure for the eventual implementation of VR/AR technology into the curriculum?

Czech Republic	Austria
VR/AR technology can be included in the teaching of future teachers in the form of implementation in subjects of a common pedagogical-psychological basis (general didactics, personality and social development, general psychology for teachers, pedagogical communication, etc.), where the technology would primarily serve for the possibility of simulating variants of situations, with which students can meet in pedagogical practice and can thus enrich theoretical knowledge with specific "real" situations in which they will combine it with practical skills, and which cannot always be planned in ordinary teaching practice lessons at schools. It can also be used to simulate the solution of possible disciplinary offenses by pupils, problem situations.	Currently, the terms virtual reality or augmented reality are not used in the curriculum. At most, approaches can be noted in the special subject of media design, which is, however, implemented only in special types of schools.
	As the technologies are described very vaguely and openly in the documents above, VR and AR technologies could in principle be used and delivered in any course already.
VR/AR can be involved in the implementation of the subject Analysis of Pedagogical Situations, which is currently directly focused on working with real situations at school. Situations from practice, selected by students, could thus be programmed into VR and the proposed solution could be verified within the seminar. Within psychology subjects, VR can be used to train teachers in communicating with students about serious topics (death in the family, etc.). VR can also be used to train future primary school teachers in recognizing the signs of learning and behavioral disabilities.	
In addition to actual implementation of practice, VR/AR could be a suitable source of verification of methods and forms of teaching in practical school situations within subject didactics and methodical study subjects, according to the nature of the educational area (M, F, Aj, Bia under, always with regard to on appearance and respect in FEP BE). In VR, a system can also be created for speech training of future teachers, focusing on voice work, eye contact, intonation, etc.	
For the possibilities of a doctoral study in pedagogical psychology - research on how VR/AR can influence teachers' reactions in practice, to what extent it can simulate real situations that take place in school.	

Is there a possibility of more systematic training of current teachers in the field of VR/AR? (DVPP)

Czech Republic	Austria

Czech Republic

VR/AR can be used in the education of existing teachers as part of the Additional Pedagogical Studies and in DVPP courses (third subject) - qualification enhancement, in the field of general and subject didactics to give students a better idea of the methods and forms of teaching in primary and secondary schools. VR/AR can support the theoretical framework by demonstrating the practical implementation of theoretical teaching principles.

For DVPP students, especially beginning teachers, VR/AR can also be used to practice problem situations with students that they may encounter in practice.

In the case of the offer of continuing education courses for teaching staff, it is also possible to create a specialized short-term course accredited by the Ministry of Education, Youth and Sports in the DVPP system.

However , there are also fundamental problems associated with the potential development possibilities of VR/AR in the preparation of future teachers and within the DVPP.

Higher involvement of VR/AR in teaching also entails higher demands on technical equipment. Currently, several VR headsets are available at the Faculty of Education of JU. For effective use, at least model class VR is required, which means about 17 glasses and at the same time the need for sufficiently large spaces.

The second obstacle to a more massive deployment is the absence of teaching materials, procedures and models. There are a number of applications of a game nature, but there is a lack of quality didactic materials, both at the level of the Faculty of Education of the JU and the Czech education system. However, the creation of these materials already requires greater knowledge of technology, programming and testing.

The above-mentioned possibilities of implementation into the curriculum can be realized provided that the teachers of individual subjects/courses are able and willing to master these technologies. This places additional demands on educational institutions, as experience in the academic environment with the involvement and use of these technologies is scarce, as is the case in primary and secondary schools in the South Bohemian Region.

Austria

Given that the current curriculum and the closely related competence model " digi.kompP " already allow the use of all kinds of technologies - and thus the doors are open to VR or AR from the curriculum side - there is no need to make corresponding adjustments to the curriculum.

Therefore, we were already investigating whether there are specific courses with information on the use and use of VR/AR as teaching or study content:
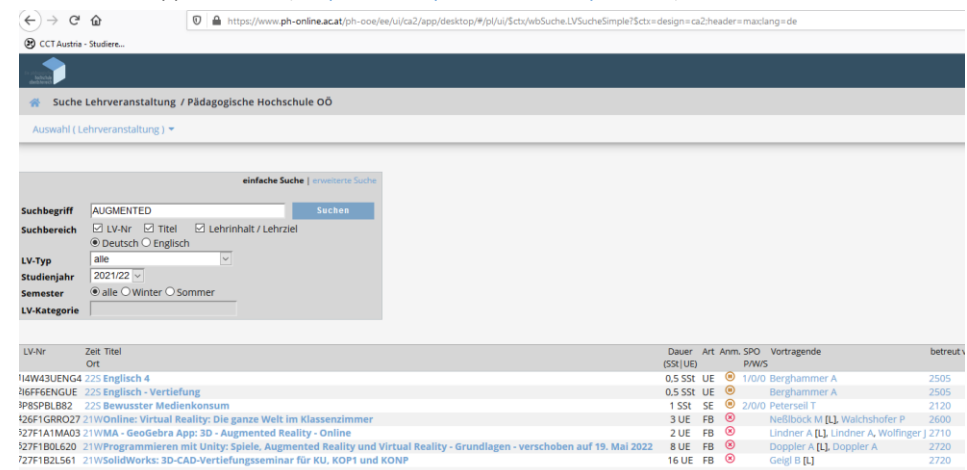
A survey of VR/AR teacher education courses at universities

The curriculum is the framework for the courses in which future teachers will be educated.

The exact courses and their content are stored in the online database "PH online" (https://www.ph-online.ac.at/), which is used by every college of education.

We searched this database to see if the terms "virtual reality" or "augmented reality" currently appear in the courses.

In the current academic year 2021/2022, three introductory education events and four advanced teacher education events containing the word "extended" were found at the University of Education in Upper Austria (https://www.ph-online.ac.at/ph-ooe/):
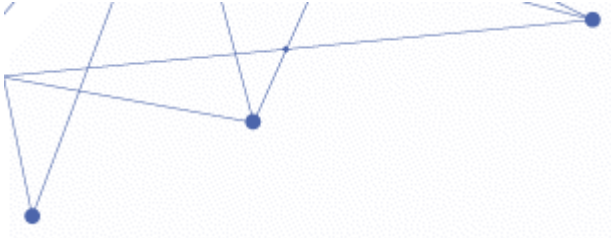

All three introductory trainings were intended for future English teachers. Four advanced teacher education courses focused on mathematics (1), were intended for teachers of higher vocational schools (2) or did not concern any specific subject at all (1).

Searching for "virtual reality" will show three advanced teacher courses that were already part of the search results for "advanced".

When searching the database of the courses of the Private University of Pedagogy, Diocese of Linz (https://www.ph-online.ac.at/ph-linz), only one advanced teacher education course containing the word "advanced" was found for the current academic year:

A search for the term "virtual reality" found another continuing education course:

Virtual reality and augmented reality appear very sporadically as concepts in initial or further education at teacher training colleges in Upper Austria.

Media laboratories at universities of pedagogy

It is worth mentioning that in the bachelor's curriculum [16]there are two hours of media laboratory in the first introductory module (see MG B 1.5 Medienlabor p. 382) and the other three hours of media laboratory (see MG B 4.2 Medienlabor II p. 383) are the subject of another specialized module. In addition, the New Media – Technology, Art, Culture module can be used for VR or AR (see MG B 5.3 New Media – Technik, Kunst, Kultur p. 383), which is intended as a pedagogical practical module.

The term media lab (medialab) indicates that innovation laboratories for greater use of digital media are offered at universities.

These labs are called educational innovation studios (see also https://eis.eeducation.at) and are learning labs that aim to encourage pupils, students and educators to use new media. In these labs, hardware and software are available to work on topics such as Robotics, Design Thinking and Programming: The overall aim is to foster competencies and skills for the 21st century.

In Upper Austria, there is a Studio for Innovation in Education (=EIS) at the University of Education in Upper Austria (see https://ph-ooe.at/eis). However , the topics addressed there do not include virtual and augmented reality (see https://ph-ooe.at/eis/themen).

https://www.phdl.at/service/medien/medienwerkstatt/) at the Private College of Pedagogical Diocese of Linz , which is already equipped with an Oculus Rift device that students can use (see section " Geräte serviceen " at https://www.phdl.at/service/medien/medienwerkstatt/).

This media workshop and the equipment available in it, including the Oculus Rift, may be used by students outside of the course after consultation with the course instructor or in agreement with the media coaches.

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[16] https://www.lehrerin-werden.at/fileadmin/user_upload/pdf/Bachelorstudium_Lehramt_Allgemeinbildung.pdf