

Chapter 1

Recent Technological Challenges in (Vocational) Education



Thomas Köhler and Jens Drummer

1.1 Introduction

It is rather difficult to obtain precise figures of trends in the current training and eLearning market, eLearning being understood as any activity by which learning content is partially or totally delivered by digital means, including open and distance learning (ODL) platforms, massive open online courses (MOOCs) and serious games (SG) as discussed by Marquet and Köhler for Europe (2017) as well as for the German school sector by Köhler (2017). Indeed educational approaches are embedded into the industrial configuration of the respective era – even though such is often a quite conflicting circumstance.

As described in recent forecast studies, which are mainly reports delivered by consultancy agencies or produced by international bodies, Western Europe is the second largest market in the world after North America and that global Western European 2016 revenues will be around €7.3 billion (Docebo 2016) of the €96.3 billion for the entire world. As a comparison, the video game industry should generate (only) approximately €87 billion in revenues in 2016 (Newzoo 2016). Central Asia may be described as a still growing region but with a similar variety of specific situations and conditions. Not only for Europe educational statistics however confirm that adoption of digitization in the educational sector is rather heterogeneous and lacks behind other branches (Erber et al. 2004; Köhler et al. 2013; Pscheida et al. 2015). That rather late adoption will be addressed to some extent by the subsequent sections of this paper.

T. Köhler (✉)

Faculty of Education, Technische Universität Dresden, Dresden, Germany
e-mail: thomas.koehler@tu-dresden.de

J. Drummer (✉)

Saxon Educational Institute, Ministry of Education, Dresden, Germany
e-mail: jens.drummer@mailbox.tu-dresden.de

© The Author(s) 2018

J. Drummer et al. (eds.), *Vocational Teacher Education in Central Asia*,
Technical and Vocational Education and Training: Issues, Concerns
and Prospects 28, https://doi.org/10.1007/978-3-319-73093-6_1

Although the quoted data is probably unverifiable and differs in other continents, figures show that the eLearning sector has surprisingly become more important than the gaming sector and that more and more people, students, workers and individuals are now placed in the situation of being tempted or obliged to learn remotely, which gives an overview of not only the existing industrial and business competition but also the remaining scientific challenge. This situation may be interpreted as the consequence of the progressive invasion of Information and Communications Technologies (ICT) in all activity sectors since the beginning of the 1970s. In fact, ICT has reduced the duration of innovation cycles considerably (from several years to several months, even weeks sometimes) due to the need for the industrialization of a new product. This is in Europe particularly true in automotive sectors, which employ directly or indirectly approximately 9% of the working population in France (Le Monde 2015) and 14% in Germany (statement of German government 2017¹). By analogy, ICT is now considered being able to reduce the timeframe of adaptation of the working population to the requirements of the globalized economy and competition by increasing the level of competence without leaving the office or the factory (Edwards and Usher 2001). After having changed our production processes, digital means are now expected to serve our need for knowledge acquisition and competence development required by permanent innovation.

ICT is also considered to be a part of the solution for developing countries to reach the 2015 objectives for education, defined in 1990 during the Jomtien World Conference on Education for All (UNESCO 2014), and that still requires a good deal of effort from the countries concerned. In particular, the objective developing adult and continuing vocational education can benefit from the delivery of training content by digital means, in other words through eLearning products of good quality, especially for teachers and teacher trainers. In this regard, the role of ICT in lifelong learning has been recently reaffirmed in the Education 2030 – Incheon Declaration (UNESCO 2016). With a focus on rural areas – as they are representative for many regions in Central Asia as well as some regions in Europe and based on the “Rural Wings” project – a wide range of usage and usage scenarios of Internet via satellite in rural areas have been tested and evaluated by the contractors for the EU (see Kahnwald et al. 2008). While first online learning scenarios for rural areas were aimed at recognizing users (teachers, students, trainers, entrepreneurs, farmers, administrators, citizens, etc.) and capturing the diversity of their online activities. As a traditional broadband connection could not be realized in any of the cases, it was necessary to develop a new form of online learning applications and tools that could improve the everyday life of the rural community (e.g. access to educational resources, vocational training, e-governance, lifelong learning, etc.) (cf. Köhler and Neumann 2014).

In short, educational issues as well as economic issues are placing ICT in education and training as one of the main levers for the enhancement of the professional

¹Retrieved from <https://www.bundesregierung.de/Content/DE/Magazine/emags/economy/051/sp-2-die-automobilindustrie-eine-schluesselindustrie-unseres-landes.html> on 11.03.2017

conditions of people and countries, so that the design of virtual learning environments (VLEs) becomes one of the key aspects of the success, but also the failure, of vocational education and lifelong learning. Of course, research does not claim to offer a single solution to this complex problem. Nevertheless, if respective professionals intend to increase both quality and observable effects on the knowledge acquisition and competence development, the wide adoption of ICT in vocational training and professional learning together with new tool may lead to the adequacy of human resources with social demands. Such understanding is the starting point for both the operationalization of generic methods and the subsequent designing of respective virtual learning environments.

1.2 Methodology of the Origination of the Present Article

In order to initiate this analysis, a pre-empirical study of theoretical and practical approaches from the author's point of view first took place. The basis for this was, in essence, the review of current discourses by means of educational, educational and educational literature. The reason for this was the cooperation in a working group on open educational resources at the German Education Ministers Congregation (KMK).

On the assumption that this selection is incomplete and also interpreted, and finally limited to the German and English language areas, the discussion with a total of eight groups of experts took place in a second step. Thus, the author was able to discuss his reflections, observations and its interpretation in the period from April to October 2016 with (I) a group of international vocational training experts in Central Asia, followed by (II) seminar leaders of general and (III) professional teacher training from all over Germany and (IV) working in two working groups to deepen them at an online conference with (V) Mongolian computer scientists as well as (VII) postgraduate students in the field of personnel development and finally (VIII) supervisory staff in enterprise training.

It turned out that the assumptions were incomplete on the one hand and will require further clarification. However, the question of a further empirical reasoning has never been raised. For the deepening of the considerations in the elaboration of the text, the author's thanks go to Christian Heimann (Department of Science, Education and Culture Baden-Württemberg), Beat Döbeli Honegger (Swiss Pedagogical University Zurich), Jens Drummer (Saxon Education Institute Radebeul), Matthias Wesseler (Unistaff Associates Kassel) and Werner Wollersheim (Leipzig University) not least together with the participants of the International Conference on "Future Trends in Technical and Vocational Education and Training" in April 2017 in Bishkek, for their encouragement to deepen the topic further.

1.2.1 Promises of User/Learner Involvement in Online Education by a New Openness Through OER and MOOCs

The conditions of school, vocational and continuous learning change globally; teachers are faced with the challenge of using digital media extensively in teacher training and vocational school, or to allow and support their use. Novel media concepts such as BYOD (bring your own device) or open educational resources (OER) represent only the head of comparatively extensive development dynamics.

What promises and challenges for vocational school and vocational teacher training are based on new media? A series of media didactically novel concepts is currently attracting considerable attention in non-school educational practice and increasingly also in specialist disciplines in education sciences. It is about the availability of private and personal technological infrastructures (BYOD) as well as about the question of institutional openness and openness (OER, MOOC, etc.) but also the authorship of knowledge (user generation of content). As a result, different learner behaviours can be expected, which can take place more independently than before and especially in new communities. Didactic principles such as that of simulation are complemented by the augmentation of reality; the support of educational activity through augmented (AR) and virtual realities (VR) becomes an everyday experience. These technological and socializing dynamics are accompanied by a quasi-comprehensive picture of all educational activities in the form of data. With the approach of learning analytics, Big Data has also reached educational practices.

In recent years, there have been increasing indications for an increasing willingness to discuss the effects of this type of technology-based learning (TEL) in a relatively emotive manner. However, the fact that this is still a challenge is shown by the current discourse about the digitalization of the vocational and general education schools (but also of the universities) and the concomitant conflicts. In the following, selected trends in media and eLearning, teaching and education approaches will be documented and discussed. In doing so, the author does not attempt to meet a single learning paradigm or a specific learning theory. Rather, possible educational and learning theories in the sense of an educational pragmatism (Köhler et al. 2008) are only introduced in the second step – although not all observations can be located in this scientific domain.

The subsequent section does not examine the question of the pedagogical core of this development; rather it investigates how the work with free teaching and learning materials can be translated into everyday school life and what this has to do with openness. We address five trends in a thesis-like manner, deal with the differences between this new form of media in the vocational school and conventional teaching and learning media and consider the applicability in the (vocational) school to finally allow discussing the basic conditions in teacher training, both in Europe and Central Asia.

While learning objects are usually produced by specialized publishers and released for use by the responsible educational authorities. The production of learning objects by the pedagogical specialists, i.e. teachers, in the preparation is

limited to a few subordinate formats (panel, copies, test arrangements, etc.). Often these are also copies of objects produced on the publisher's side rather than actually produced freely.

What is happening in the context of the new openness? Educational materials (learning or knowledge objects) and educational institutions are open to any person who is interested in them, without having to prove access requirements or to obtain an authorization. This is a fundamental departure from previous educational practices as institutional affiliations and limitations become questioned. The focus is on the interest in a topic or object, which is similar to a freely accessible library, but without the need for an organizational commitment (membership, enrolment).

UNESCO has devoted itself to the possibility of using OER as a new core element of a wide range of educational efforts, as the definition shows:

Open Educational Resources (OERs) are any type of educational materials that are in the public domain or introduced with an open license. The nature of these open materials means that anyone can legally and freely copy, use, adapt and re-share them. OERs range from textbooks to curricula, syllabi, lecture notes, assignments, tests, projects, audio, video and animation. (UNESCO 2015)

1.2.2 User Generation of Educational Contents and Learning Materials

As mentioned in the previous section, the question of the authorship is a central aspect for the creation of learning objects. Especially novel online platforms such as Wikipedia, YouTube or BLOGs lead to a change of the possibilities of use from the front desk to the production. While traditional mass media technologies such as press, radio, television and production are in the hands of a few specially qualified specialists, the picture is already changing with the introduction of the Internet. Almost everyone can in fact produce online content.

So what happens? Educational materials, learning and knowledge objects, as well as various other content, can be produced and published by anyone who has some interest in it. Any potential interested person can also access these objects, insofar as the insights and interests of each individual can be shared with any other person! Learning is possible without teaching materials (e.g. textbooks) usually provided by a teacher or produced by a small group of selected experts only (e.g. instructional specialists or subject authors).

The OECD study on *Participative Web: User-Created Content* (cp. OECD 2007) shows a collection of well-known tools of the so-called Participation Web that help the users of the Internet in creating contents of several formats easily. Moreover, the study defines the concept of the participative web as "based on an Internet increasingly influenced by intelligent web services that empower the user to contribute to developing, rating, collaborating on and distributing Internet content and customising Internet applications. As the Internet is more embedded in people's lives 'users' draw on new Internet applications to express themselves through 'user-created content' (UCC)".

1.2.3 Independence of Learning Behaviour and the Socialization in New Community Forms

How do learners use the new technological and organizational possibilities? Looking at the learning behaviour, a new independence of the learner occurs. As well we should take into account that the learner becomes invisible, at least cannot be seen face to face by teachers. With a comparatively specific reference to the design of classroom situations in classical formats, this is referred to as open class, virtual school or mobile learning.

What is happening? The group of learners leaves the approach of a purely teacher-led activity to be replaced by a learner-driven community. In this respect, the social moment is preserved, but the learner is more likely to take over the control, since only activities according to their interests may be implemented. Here, every learner can and must decide where, when and which educational experiences are most appropriate – but not necessarily follow the path set by the educational institution and its representative. Whether this is equally suitable for every learner is not assured (see e.g. Drummer 2009). That such individual behaviour may be embedded into social contexts again is as well investigated in research (cp. Kahnwald and Köhler 2007) and discussed under the label of microlearning, which may occur as changing information behaviour in virtual communities of practice.

The basis of established teaching forms is a particular social organization. The vocational or general school class, which is an especially designed large social group (as well as a spatial configuration), is typical for the school, or even constituting it, in addition to the division of roles between pupils and teachers. In line with the so-called small or working group, the school class is a social entity that operates on a face-to-face basis and is stable in regulation over a period of many years. This small group also differs from a project group. In some instances, even in higher school years, project groups are often found in class form alongside the regular groups.

What happens when, as described above, this strict localization is dissolved and online communities are formed? It can be observed that these are superimposed with classical learning communities, both temporally and spatially. This is surprising because it can be assumed that online communication is less useful than individual face-to-face communication (Köhler 2016). However, this is obviously not applicable, as is shown by the widespread use of WhatsApp or Facebook-supported small groups. Also typical for an online community is the lack of limitation on the number of members when spatial barriers are eliminated. This increased number of members is also necessary because the invisibility of the other members (or learners) creates an uncertainty as to whether other persons are actually to be found, and only a significantly larger number of mostly several hundred members lead to a sufficient intensity of the exchange (Cheshire and Antin 2008).

Typical examples of these online forms of community in education are virtual learning communities where the learners encounter each other in an inverted or flipped classroom, or the communities of practice (“CoP”, cf. Lave and Wenger

1991; Köhler and Kahnwald 2013). For the vocational and professional education context, this matches especially with the need to interlink the workplace with the educational context.

1.2.4 Data-Based Education Analytics: Online, Massive and Physical

The use of digital devices by the learner leaves large data records (Big Data), even if the learner or the lecturer does not intend this. In fact, any interaction between the learners and the learning object leads to an information technology reaction, other than learning with a paper-based learning material. In most cases, this data is neither collected nor used. Indeed, when learners or apprentices are aware of these data streams – as well as teachers – their discussion often turns around questions of data protection or fears of possible misuse. A systematic use of these naturally occurring data for the regulation of the teaching-learning process has so far hardly been considered.

If, however, the pedagogical activity is continuously monitored and the data can be used for an immediate as well as a long-term feedback process (e.g. online assessments or automated education activity records), the possibilities for an individually tailored learning support are given. Conceptual examples of this are the “learning analytics”, the “tailored training” or, in a certain way, the “online assessment”. While the tailor-made training courses as well as the online-based assessment do only follow the idea of Big Data, this has clearly placed the focus on educational research with the concept of learning analytics. However, on the basis of the idea of educational data mining (i.e. the fact that one can extract some useful correlations from the multitude of randomly occurring data), these transformations are still in a very early stage and may hardly be used in an everyday educational practice (cf. e.g. the study by Stützer et al. 2015 on social science analysis in higher education).

1.3 Conclusion: Toward a Better Understanding of the Interface Between Educational Practice and Online Technologies

The development of online technologies has affected educational practice dramatically and coined a new interest in the vocational and professional education domain. However, above all, as Marquet and Koehler (2017) write, the main interest in tools like MOOCs and VLEs is to implement qualitatively new learning objects that were not reachable with traditional 2D technologies, such as paper-pencil/blackboard-chalk/handbook-teacher. Retrospectively, it can be considered that most of the

contents taught today are those that are compatible with the printing industry and writing by hand. Although many innovative ways of delivering content can benefit from the use of ICT (Sharples et al. 2015), by exploiting connectivity between learners’ event/content-based learning opportunities and learning by doing experiences, they all aim to optimize existing teaching techniques supported by ICT. This, for instance, is the case for peer assessment in MOOCs and flipped classrooms in blended learning programmes (Fig. 1.1).

Recent changes in teaching practice and learning conditions listed above also suggest that openness, as provided by OERs, and further approaches need to be usable as well as to be available. Their use by learners and, occasionally, difficulties encountered by learners while using them can be explained by instrumental conflicts. However, more interesting, their design can benefit from the distinction between didactical objects and pedagogical (re)presentation of these objects to be used online. Altogether, this calls for the application of suitable theoretical paradigms that reach beyond classic learning theories on the one hand.

On the other hand, such new understanding of socio-technological conditions needs extension by additional consideration of framing institutional circumstances, which has rarely been discussed in educational literature and was rather a topic of some sociological and business studies. What is a remaining challenge is to educate and train teachers in a way that allows them applying such renewed analytical understanding in their daily practice when applying digital technologies in and outside the classroom. Authors intended opening up education-theoretical reflection by rethinking educational practice online toward an empowerment of its users.

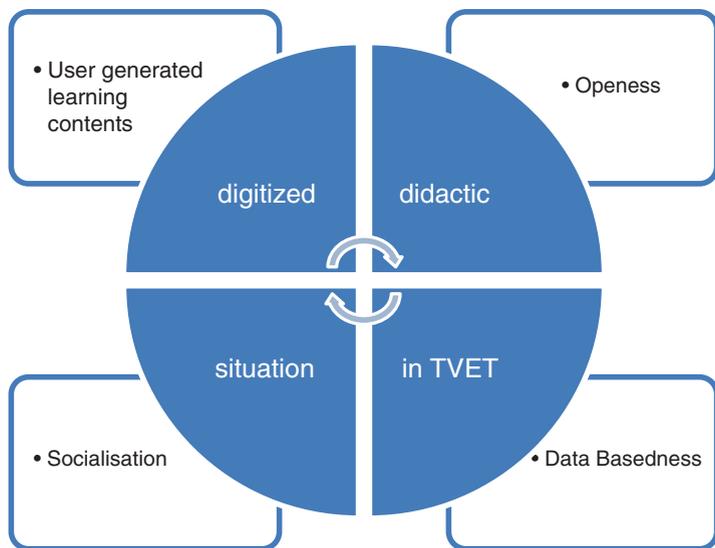


Fig. 1.1 Key components of didactic situations in TVET through digitization

1.4 Challenges in Vocational Education as Key Focus of the Book

All aspects of this article could be taken directly into the training of vocational teachers. This book, however, would like to present a broad spectrum of relevant contributions in vocational education and training from Central Asia and Europe. Indeed technical vocational education and training (TVET) has a serious linkage with industrial production in any economy or economic sector. This interface allows applying the design-oriented research approach in order to ensure fitting the need of a rapidly developing domain. As described above such is not limited to either Europe or the region of Central Asia, it is moreover a universal condition.

With respect to that consideration, the editors of the presented book, who are simultaneously the academic chairs of the 2017 International Conference on “Future Trends in Technical and Vocational Education and Training” in Bishkek, decided to structure the scholarly discourse into five parts, each collecting a bunch of recent contributions to the sector:

Part 1: Project-based learning

Part 2: Specific didactics of laboratory work

Part 3: Media and new technologies in TVET

Part 4: Evaluation and development of competencies

Part 5: Research methods in TVET

When editors structured the book into those five parts, the idea was that the first part should provide an overview over the large field of project-based learning. Authors present the potential of this method especially in the TVET. Indeed most of the articles are results of a large project which is labelled “USPECH” (this means success in Russian language), developed by the German Corporation for International Cooperation, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. In the first article of that part Christian Stehling and Uwe Munzert discuss Project-Based Learning (PBL) in general, while the next article does focus on the opportunity for strengthening the innovative potential of PBL for TVET in the context of the USPECH experiences, written by Navbahor Sharipova and Matthias Wessler. The last article in the first chapter by Asylbek Isabekov and Gulzat Sadyrova analyses PBL in order to develop students’ creative abilities.

The following two parts discuss possibilities how specific didactics and new media technologies can be implemented in teaching. Part two has its focus on specific didactics of laboratory work, and Maksudakhon Abdullaeva analyses laboratory work in the education of food technology professionals. Franz Horlacher describes the theoretical-practical cake, which is linking theory and practice in food industry education. Finally, Manuela Niethammer shows the potential of the task-based learning for the sustainable development of food technology.

In the subsequent part three, media and new technologies in TVET are presented. First Lafiz Boboev, Zokirkhodzha Makhmudkhodzhaevich Soliev and Firuz Asrorkulov discuss the Virtual Laboratory and its meaning for an improved quality

of education. The application of modern educational technologies for managing project activities in the context of a Master of Education is analysed by Rimma Masyrova, Viktoria Vyacheslavovna Savelieva, Janat Bisenbaeva and Bakhyt Atymtaeva. With their article on the significance of the Media Didactics Course for Masters of Vocational Education, Mamatair Joldoshov and Ainura Bekbolsunova follow that focus of innovative academic education, which is as well addressed by the considerations on the significance of using business simulations in training of bachelors and masters, presented by again Mamatair Joldoshov with Jypargul Sayakbaeva. The final paper of part three is authored by Masuma Bashirova, Alymkan Sattarova and deals with the use of new teaching and learning technologies for professional qualifications development in the system of the initial and secondary vocational education. An important part of teaching is the development of skills – therefore some examples of how this can be achieved are presented next. In addition, the evaluation is a special task in the teaching process – using the example of the evaluation of the implemented project, it is made clear how the quality can be improved. Finally yet importantly but not, it shows how research methods can be used in teaching.

Part 4 is devoted to the evaluation and development of competencies. It starts with a reflection on the technical training of teachers of vocational education in higher educational institutions, authored by Svetlana Udartseva, Tatyana Ikonnikova, Tamara Udartseva, Tatyana Chausova and Gulfarida Samashova. Approaches of engineering pedagogy as a suitable means in order to improve the quality of teaching in engineering education are presented by Steffen Kersten and next Ekaterina Golubina; Alexander Löser explains how competency-based exams function in professional education in Germany versus Central Asian TVET contexts. Finally the focus shifts to empirical work when Metwaly Mabed and Thomas Köhler present their learning performance research paper, which has been developed for monitoring academic achievement in electrical engineering for vocational secondary schools, and the quality management for projects and workshops article authored by Jens Drummer.

In part 5 papers continue with an even stronger focus on research methods in TVET. First the significance of scientific research in the professional development of students is investigated by Mukhabbat Ikrami, before Gafurjon Khakimov and Kalybek Dykanaliev define how to prepare Masters of Vocational Education for conducting research activities. The final paper then stresses the highest scholarly level of research training for doctoral candidates in the field of education and technology and is again presented by Thomas Köhler.

The book's Annex contains a list of authors' affiliations, listings and some further collections of empirical material on the potential of the task-based learning for the sustainable development of food technology as well as the English version of an electrical engineering achievement test for Vocational Schools.

References

- Cheshire, C., & Antin, J. (2008). The social psychological effects of feedback on the production of internet information pools. *Journal of Computer Mediated Communication*. <https://doi.org/10.1111/j.1083-6101.2008.00416.x>.
- Docebo. (2016). ELearning market trends and forecast 2014–2016 report. Dubai.
- Drummer, J. (2009). Einfluss verschiedener Typen online basierter Lernplattformen auf die Kompetenz und Leistungsentwicklung von Schülern. Dissertation, Technische Universität, Dresden.
- Edwards, R., & Usher, R. (2001). Lifelong learning: A postmodern condition of education? *Adult Education Quarterly*, 51(4), 273–287.
- Erber, G., Köhler, T., Lattemann, C., Preissl, B., & Rentmeister, J. (2004). *Rahmenbedingungen für eine Breitbandoffensive in Deutschland*. Berlin: Deutsches Institut für Wirtschaft.
- German Government. (2017). <https://www.bundesregierung.de/Content/DE/Magazine/emags/economy/051/sp-2-die-automobilindustrie-eine-schluesselindustrie-unseres-landes.html> on 11.03.2017.
- Kahnwald, N., & Köhler, T. (2007). *Microlearning in virtual communities of practice? An explorative analysis of changing information behaviour*. *Micromedia & eLearning 2.0: Getting the big picture*. Proceedings of Microlearning 06. Innsbruck: University Press.
- Kahnwald, N., Köhler, T., Makri, R., Uzunoglu, N., Sotiriou, S., Koulouris, P., & Sotiriou, M. (2008). Connecting rural knowledge communities with satellite based WEB technologies. Usability aspects in the Rural Wings project; In: *Proceedings of IADIS Web Based Communities 2008* [CD-ROM].
- Köhler, T. (2016). Visual anonymity in online communication. Consequences for creativity. In: A.M.J. Skulimowski, & J. Kacprzyk (Eds.), *Knowledge, information and creativity support systems: Recent trends, advances and solutions*. Selected Papers from KICSS'2013 – 8th International Conference on Knowledge, Information, and Creativity Support Systems, Nov 7–9, 2013, Kraków, Poland; Series: Advances in Intelligent Systems and Computing, Vol. 364., New York: Springer.
- Köhler, T. (2017). Neue Medien – in Lehrerausbildung und Schule. In: BAK Hefte 1/2017 zur 50. BAK-Tagung “Medien in Schule und Lehrerbildung” Leipzig.
- Köhler, T., & Kahnwald, N. (2013). Online Communities: Enterprise Networks, Open Education and Global Communication. Proceedings of the GeNeMe 2013; Dresden, TUDPress; <http://nbnresolving.de/urn:nbn:de:bsz:14-qucosa-153950> (abgerufen am 19.08.2015).
- Köhler, T., & Neumann, J. (2014). *Elektronische Bibliothek des Reformprozesses im beruflichen Bildungssystem. Expertise zur technischen Realisierung für GOPA – Gesellschaft für Organisation, Planung und Ausbildung mbH*. Dresden: GWT-TUD GmbH / Technische Universität.
- Köhler, T., Kahnwald, N., & Reitmaier, M. (2008). Lehren und Lernen mit Multimedia und Internet. In B. Batinic & M. Appel (Eds.), *Medienpsychologie*. Berlin: Springer.
- Köhler, T., Kahnwald, N., & Reitmaier, M. (2013). Обучение и учеба с помощью мультимедийных технических средств Обучения (TCO) и сети Интернет. In S. Taschpulatov, S. Jakubov, F. Sokirov, & S. Amurova (Eds.), *Problems and solutions of preparation, retraining and professional development of leading and pedagogical staff of the system secondary vocational, professional education*. Tashkent: Ministry of Higher and Vocational Education, Institute of Training and Retraining for Educational System of Republic of Uzbekistan.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

- Le Monde. (2015). Le Monde, [online] 10 October. Retrievable at: http://www.lemonde.fr/les-decodeurs/article/2015/10/22/le-secteur-automobile-ne-represente-pas-9-des-emploisfrancais_4794416_4355770.html [December 30th, 2017].
- Marquet, P., Köhler, T. (2017). The empowerment of users: Rethinking educational practice online; In: L. Hagen et al. (Eds.), *REDA*, Berlin: Springer.
- Newzoo. (2016). *2016 global games market report*. San Francisco.
- OECD. (2007). *Participative web and user-created content: Web 2.0, wikis and social networking*. Paris: OECD. Retrieved from <http://browse.oecdbookshop.org/oecd/pdfs/free/9307031e.pdf> on 10.09.2015.
- Pscheida, D., Minet, C., Herbst, S., Albrecht, S., & Köhler, T. (2015). *Use of social media and online-based tools in academia. Results of the science 2.0-survey 2014*. Dresden: TUD Press. SLUB. Retrieved from <http://nbn-resolving.de/urn:nbn:de:bsz:14-qucosa-191110> on 09.03.2017.
- Sharples, M., Adams, A., Alozie, N., Ferguson, R., FitzGerald, E., Gaved, M., McAndrew, P., Means, B., Remold, J., Rienties, B., Roschelle, J., Vogt, K., Whitelock, D., & Yarnall, L. (2015). *Innovating pedagogy 2015: OpenUniversity innovation report 4*. Milton Keynes: Open University.
- Stützer, C. M., Breiger, R., & Köhler, T. (2015). Social academic analytics in higher education. In: *Abstracts of the Sunbelt XXXV International Sunbelt Social Network*, ISNA Publishers, Brighton. Retrieved from <http://insna.org/sunbelt2015> on 09.03.2017.
- UNESCO. (2014). *Education for all global monitoring report*. Paris: UNESCO.
- UNESCO. (2015). What are open educational resources? Retrieved from <http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/what-are-open-educational-resources-oers> on 07.03.2017.
- UNESCO. (2016). *Education 2030 – Incheon declaration*. Paris: UNESCO.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the book's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

