

# Developing ICT students' generic skills in higher education: towards a model for competence assessment and evaluation\*

Vjeran Bušelić

Zagreb University of Applied Sciences  
Vrbik 8, 10000 Zagreb  
vbuselic@tvz.hr

Katarina Pažur Aničić

University of Zagreb,  
Faculty of Organization and Informatics  
Pavlinska 2, 42000 Varaždin  
kpazur@foi.hr

**Abstract.** Role of higher education in the development of students' generic competencies has been a topic of discussion for many years and is still nowadays. Lack of conceptual clarity, classification of generic competencies as domain-specific or domain-general, and their development within curriculum or within co-curricular and extra-curricular activities are all areas requiring further work and discussion. Moreover, the methodologies for the assessment and evaluation of generic competencies within higher education have proved to be very complex and can be hardly used for benchmarking of higher education. This paper brings the overview of the main theories in the field and discusses the potential for the assessment and evaluation of student generic competencies within Croatian higher education, in the information and communication technologies (ICT) domain.

**Keywords.** Generic competences, higher education, ICT domain

## 1 Introduction

Already 20 years ago, there was a discussion whether higher education institutions (HEI) should enable students' the development of so-called employability skills or it is not their job (N. Bennett, Dunne, & Carre, 1999). Over the past 20 years, this has been a topic of interest within many research studies, as well as policy documents. Rapid development of labour market caused by the processes of globalization, industrialization and digitalization stress the inevitable role of HEIs in equipping students with employability skills. It is no longer a question whether HEIs should enable students to acquire employment skills but how to achieve it in the most effective way. The well-known model of Dacre Pool & Sewell (2007) presented in Figure 1. indicates the importance of generic skills to the student employability potential.



Figure 1. Essential components of employability  
Source: Dacre Pool & Sewell (2007: 280, Figure 1)

Building relevant generic and transversal skills, such as the ability to think critically, take initiative, problem solve and work collaboratively, is among the main strategic goals of at the European level (European Commission, 2012). Moreover, those skills are recognized among the most important to prepare individuals for today's varied and unpredictable career paths with the emphasis on development of those skills using innovative and student-centred pedagogical approaches as well as designing assessment tools through which levels of competence can be effectively assessed and evaluated (European Commission, 2012).

According to Bušelić (2018), perceiving market transition towards knowledge base economy, in the first period of graduate employability agenda (2003 – 2008) most important graduate employability researchers like (Hall, 2004; S. E. Sullivan & Arthur, 2006) headlined career development issues regarding shift towards boundaryless/protean career and self-responsibility for its own future. The next wave (2008 – 10) emphasized concept of graduate attributes (Bridgstock, 2009) with strong connection to labour market needs (Tomlinson, 2008). In between those “graduate employability clusters” there was also very active discussion on reduced potential or even

\*This paper is published and available in Croatian language at: <http://ceciis.foi.hr>

mismanagement of talents (Brown, Hesketh, & Williams, 2004), indicating needs for shift in educational politics producing not just more graduates, then also adequate ones.

Today, depending mostly on context, several terms are used interchangeably: generic, transferable or employability skills. According to Jackson and Chapman, employability skills are “those which enable new graduates to effectively apply their technical knowledge in the workplace, and typically comprise communication, team working, self-management and problem-solving skills” (Jackson, 2014). (Jackson & Chapman, 2012) found out that there is alignment between the perception of academics and industry about the requirements for graduates’ generic competencies, but however, HEI are still criticized on their efforts to produce employable graduates.

The aim of this paper is to contribute to the discussion about the development of generic competencies in higher education, and elaborate the potential for the assessment and evaluation of student generic competencies within Croatian higher education, in information and communication technologies (ICT) domain.

## 2 Generic competences and higher education

Through Tuning project (Tuning Educational Structures in Europe, 2010) generic competences found prominent place in the Bologna reformation of European higher education. Project identified 17 different students’ generic competences; educational institutions should cherish and take care of their development through reformed curricula and various extra-curricular activities.

In the Learning and Employability Series of very influential publications, under very practical title “Embedding employability into the curriculum”, (Yorke & Knight, 2005) recognized 35 aspects of employability, structured within three categories: personal qualities, core skills and process skills. Those aspects of employability actually covers all the generic skills identified by Tuning projects, and also the ones from earlier model of N. Bennett, Dunne, & Carré (1999). In one of first discussions on the mismatch between what higher education provides and what employers state they need, Bennett identified four categories of generic skills set: management of self, management of information, management of others and management of task. In the same paper he also provided six different patterns of course provision in higher education, which included development of generic skills.

### 2.1. Lack of conceptual clarity

Putting effectively graduate or generic competences in “regular” curricula was not, and still is not an easy task. Experiences from Australian education system, which positioned education as one of the keys to the nation's prosperity in the new knowledge economy as early as in 1992, stated that “generic graduate attributes’ have come to be accepted as being the skills, knowledge and abilities of university graduates, beyond disciplinary content knowledge. They are applicable in a range of contexts and are acquired as a result of completing any undergraduate degree. They should represent the core achievements of a university education” (National Board of Employment Education and Training & Higher Education Council (Australia), 1992). Therefore, when in beginning of new millennia the development of graduate attributes statements became a condition of government funding, most of Australian universities responded to the government’s graduate attributes agenda at a policy level. However, the implementation and uptake of effective initiatives has remained ‘patchy’. Mainly because of lack of conceptual clarity, as adjectives such as ‘generic’, ‘core’, ‘key’, ‘enabling’, ‘transferable’ and ‘professional’ are used in tandem with nouns such as ‘attributes’, ‘skills’, ‘capabilities’ or ‘competencies’” (Hammer, Star, & Green, 2009).

### 2.2. Domain context

The other problem of teaching generic competences lies in psychology of cognitive performance theories simplifying that generic competences are always some mixture of domain-specific and domain-general information. In that sense, teaching of generic competences is mostly contextualized, heavily depending on domain of learning. Some even radicalized this concept, claiming that “Domain-Specific Knowledge and Why Teaching Generic Skills Does Not Work“, where authors suggests “that teachable aspects of problem solving skill are entirely dependent on large amounts of domain-specific information stored in long-term memory, rather than on other factors such as domain-general skills” (Tricot & Sweller, 2014, p.266). That is why most generic competences are embedded in context knowledge, sometimes not even recognized by lectures as domain-general skills, thus never “promoted” as acquisition of particular general competences.

### 2.3. Embedding into learning outcomes

Full propagation of generic competences in a sense Australian initiative promoted, can be found in some countries/universities which implemented learning outcome based curricula from the each curricula up to the study level. (Bušelić, 2019) illustrate this practice with University of Kansas Six Core educational goals

that can be met by a variety of courses and educational experiences. For example, their goal “Integrate information literacy, research skills and information resources into the curriculum to enhance critical thinking, academic success and lifelong learning”, has two specific learning outcomes, with related metrics attached. In order to gain this particular skill, on a list of University of Kansas Critical Thinking and Quantitative Literacy approved courses, there are 204 courses within this particular goal accompanied with learning outcomes 1 or 2, so student can pick its own domain context.

Other approach of defining their own students’ generic competences to focus on, is Finnish Laurea University of Applied Sciences. Concisely, they used competence definitions out of four distinguished and approved sources: (1) European Qualifications Framework, EQF: Level 6 (Bachelor), (2) Tuning Generic Competences (TGC), (3) Dublin descriptors and (4) Finnish national generic competences (Bachelor Level), and defined their own - Laurea generic bachelor level competences (Kallioinen, 2010).

How this blending of generic competences into national or regional context can skew the starting point is described in a comparative study of Tuning generic competences of graduates in four world regions – Europe, Latin America, Africa and Russia (Beneitone & Bartolomé, 2014). Authors classified and compared the list of generic Tuning competences, analysed the importance in different cultural contexts, and classified and clustered them across regions. The differences in importance of Tuning generic competences in Russia and Europe are shown in Fig2.

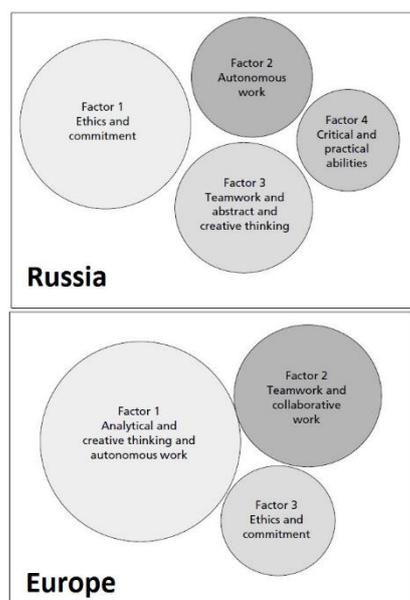


Figure 2. Interpretation of Tuning GC factors (Russia and Europe) Source: Beneitone, P., & Bartolomé, E. (2014, Figure 1 and 2)

## 2.4. Extra-curricular activities

On the other hand, especially in context of employability skills, literature also recognizes the importance of various extra-curricular activities in developing student generic competences because study programmes must meet accreditation requirements of different regulatory bodies and therefore the crowded curriculum is often lacking a space for employability skills development (Pegg, Waldoock, Hendy-Isaac, & Lawton, 2012). Kinash et al. (2014) recognized engaging in extra-curricular activities, international exchange, attending networking or industry information events, networking on social media, volunteering, internship etc. among employability strategies. Pegg et al. (2012) stress a challenges for HEIs to enhance student employability potential by making stronger connections between students’ career intension and their learning, working, co-curricular and extra-curricular activities (p. 8). Other authors also recognized that generic skills might be embedded as a co-curricular strand alongside core disciplinary curriculum and enhanced by a collaborative approach with industry engagement (Rodzalan & Saat, 2012).

## 3. Benchmarking education in Europe

Increased access to higher education, innovative teaching and learning for all through new technologies and Open Educational Resources, especially increasing internationalization and mobility of students, created need for international benchmarking standards to provide comparable evidence of student learning outcomes across EU.

Very valuable learning of worldwide assessment strategies were gathered through OECD’s Comparative review of international practices (Nusche, 2008) and projects like Assessment of Higher Education Learning Outcome (AHELO) feasibility study (Tremblay, Lalancette, & Roseveare, 2012), but most important project in this field is German research program "Modelling and Measuring Competencies in Higher Education" (KoKoHs).

Project KoKoHs carried out systematic internationally compatible fundamental research on theoretical modelling and empirical assessment and validation of student competencies in higher education. During the first funding phase (2011 to 2015) focus was on fundamental research, developing theory-driven models of generic and domain-specific competencies as well as corresponding assessment instruments. The teams of the 24 project alliances created new assessment instruments based on the 41 developed competency models and measuring instruments that should provide a foundation for assessment of learning outcomes in German higher education (Zlatkin-Troitschanskaia, Pant, Kuhn, Toepper, & Lautenbach, 2016). Currents international

state of research on measuring HE competencies is given in (Zlatkin-Troitschanskaia, Shavelson, & Kuhn, 2015), dividing assessments into two groups – direct assessments (tests) and indirect ones in a form of self-assessments. Direct large scale (national/international) assessments are operational mainly in USA, like American College Testing Program's (ACT) Collegiate Assessment of Academic Proficiency (CAAP), Educational Testing Service's (ETS) Proficiency Profile (ETS-PP), and CAE's CLA (Council for Aid to Education (CAE), n.d.). These national scope tests are undertaken by non-government testing organizations that fulfils test-quality criteria as in the Standards for Educational and Psychological Testing (AERA, APA and NCME 2014). Moreover, as indicated, most assessments are provided upon generic competences, but as "... international research projects show that generic competencies are indeed highly relevant (see the CAAP or CLA tests from the USA), they are not significant enough on their own to constitute professional competencies. These assessments need to be complemented by assessments of key domain-specific skills and knowledge" (Zlatkin-Troitschanskaia et al., 2015, 403). That is main reason why KoKoHs is such long term and complex project.

### 3.1. Models

The complexity of selecting/modelling of "just a simple" generic competence model to use, plus complexity of modelling assessment and interpretation of each competence is best illustrated through Educational Testing Service (ETS) Research Report on assessment of one of the most frequently discussed higher order skills – Critical thinking. Survey conducted in 2011 by the Association of American Colleges and Universities (AAC&U) shows that 95% of the chief academic officers from 433 institutions rated critical thinking as one of the most important intellectual skills for their students. This fully resonated with voices from the workforce, in that 81% of the employers wanted colleges to place a stronger emphasis on critical thinking. Yet, there is no universal model, because assessment methodology is a complicated effort and requires the collaboration between domain experts, assessment developers, measurement experts, institutions, and faculty members (Liu, Frankel, & Crofts Roohr, 2014).

### 3.2. Assessment methodologies

Followed also important project in development of generic competences agenda, OECD project DeSeCo - Definition and Selection of Key Competencies (OECD, 2011) a conceptual framework for assessment of key competencies is proposed (Barth, 2009). It is consistent with a notion that competencies only manifest themselves in action and behaviour in certain contexts, we have to infer indirectly to the underlying

competencies and connected attributes. DeSeCo framework shows imperative to define and to empirically verify relevant competency levels and their effects on action in different context, and to test the adequacy of different approaches.

Apart from classical division of assessments as summative, which is basics assessment used in education to grade and/or certify students' knowledge, and formative which with teachers feedback aid the student learning, (Fastré, van der Klink, Sluijsmans, & van Merriënboer, 2013) advocates a road to sustainable assessment skills. Main characteristics of sustainable assessment is not to concentrate to past or now, but into the future, to aid lifelong learning, with both teacher and student actively reflecting on given feedback.

Well-adopted methodology of lectures improvement are student surveys and/or classroom observations of teaching quality (van der Lans, 2018). Some other measurement techniques as student's self-assessments are much more controversially. It can be both formative or summative, and in general has intention of involvement of learners in making judgements about their achievements and the outcomes of their learning. In a research of self-assessment of certain employability skills of undergraduates of Business faculty in Australia (Jackson, 2014) analysed and discussed some know problems. From classical ones, student being reluctant to self-assess due to perceived inability, a lack of confidence, inclination to avoid responsibility, and/or preference for expert opinion and feedback, to main concern of student ability to accurately assess selves. Research showed a fairly substantial disparity between academic and student assessments. Especially in a first year, which aligns with opinion that their ability improves with stage of degree. It is also closely related to their academic competence, meaning better students are better self-assessors as well. On the other hand high achieving students tended to underestimate their performance while low achievers overestimated and to a greater extent. As necessary steps she proposes more guidance in a process, perhaps training, and better motivation by active engagement in the whole process, not only in self-assessment part.

Definitive plus side of use of self-assessments is well known for years, and essential in lifelong learning paradigm shift. Self-assessment as a process is generic skill itself, enabling students to have control over their own learning process (Fazey, 1993).

Latest development of assessment methodology, the performance assessment is joint effort of researcher representatives from Europe, Americas and Asia; concentrated in a work of the international Performance Assessment of Learning (iPAL) consortium. Main focus is on the measurement of generic twenty-first century skills across domains, with a particular focus on critical thinking. Project follows up results and shortcomings from already mentioned AHELO project and tasks from Collegiate Learning Assessment (CLA); already pilot tested with 30

German undergraduate and graduate students. Performance assessment comprises a collection of constructed and selected response tasks and items aimed at measuring an individual's (or institution's) performance on particular skills such as critical thinking and perspective taking. The performance tasks are high-fidelity simulations of actual real-world decisions or interpretation-situations, like "Wind Turbine" Performance Assessment pilot elaborated in (Shavelson, Marino, & Zlatkin-Troitschanskaia, 2019).

#### **4. Generic competencies of IT students – a case of Croatia**

After a detailed elaboration of the nature of generic competencies, their position within higher education and challenges in their assessment, we continue the discussion at the example of the Republic of Croatia in the ICT domain, stressing the current state and challenges, and fostering the dialog about potential solutions for the problem. The focus on a particular domain in creating competency assessment model was suggested Zlatkin-Troitschanskaia et al. (2015), due to the differences of higher education in different domains.

Generic competences are often perceived by employers as equally (or even more) important than core (domain-based) competencies. This is particularly evident in the field of ICT. A comprehensive study on critical skills and knowledge requirements of IS professionals suggest that industry will require more IS professionals with knowledge and skills in technology, management, and interpersonal skills (Lee, Trauth, & Farwell, 1995). Another meta-analysis conducted by Pažur Aničić, Divjak, & Arbanas (2017) found out that around 40% of papers on ICT education and career development stress the mismatch between learning outcomes of ICT graduates and skills requirements from the labour market and more than 70% of papers stress the importance of both technical and soft skills for ICT graduates.

Some research has been conducted on the topic in the Croatia as well, indicating the situation at the Croatian ICT labour market. Results of the "Study of demand for occupations and competences" conducted within the project Polytechnics 2025 (Mauher et al., 2015) shows that alumni stresses two types of competences necessary for doing their jobs: 1) developed competencies aligned with the nature of their work (such as communication and organizational skills, leadership skills and problem solving skills) and 2) different generic and specific knowledge and skills of using tools, technology, techniques and processes related to work assignments of certain occupations (especially software). According to the same study, employers stress responsibility, team work, adaptability, focus on work results, creativity and inventiveness, and analytical skills as the most

important generic skills. Another argument for the importance of generic competencies among ICT students is evident from the analysis of job ads on the Croatian labour market which found out that most of the job advertisement contains almost twice more generic competencies than e-competencies (Pažur Aničić & Arbanas, 2015; Pažur Aničić, Bedeniković, & Smetiško, 2017).

### **5 Key elements of a model for the assessment and evaluation of ICT students' generic competences**

Academics working on this topic concluded that higher education institution should be the main drivers in fostering the dialog about the development of student generic competences according to the employers' needs (Bušelić & Kovačević, 2016). However, in the past years, no significant progress is evident in the research on this topic within the Croatian higher education area and particularly related to the education of ICT graduates. The aim of this chapter is to foster the debate on the assessment of ICT students' generic competencies within higher education and propose a way to approach competencies assessment and evaluation. The answer to the question "Why to assess generic competencies?" has been elaborated within previous chapters so the following ones propose answer to questions "What? How? and When?" in order to provide basis for further model development.

#### **5.1 Which competencies to assess and evaluate?**

As evident from the elaboration in chapter 2, there is a large list of generic competencies within different models. The question that arise is which competencies should be assessed and evaluated – all of them or only the most important from the employers' point of view? This question should be in first place answered by employers – if HE is striving to equip students with skills and knowledge for the labour market, a comprehensive research should first be done among employers on their needs. As evident from the presented review of models and assessment methodologies, measurement of the level of acquisition of generic competencies is a demanding and complex process. Therefore, we propose the model to contain only up to 5 +/-2 most relevant competencies from the employer points of view, in order to make it feasible to assess competencies.

#### **5.2 How to assess and evaluate?**

Among the most demanding questions is whether the model should be in a form of a direct assessment, student self-assessment or the institutional assessment. The main doubt is whether students can be realistic in

self-assessment of their competencies. As already mentioned, Jackson (2014) elaborates on the positive effects of student self-assessment on the development of employability skills – it enhances student's critical thinking, encourages them to monitor and reflect their own work and performance, enhances their motivation and provides them a good basis for lifelong learning in a future workplace. However, the self-assessment struggles with certain problems, evident in the students' overrating of their competencies (Jackson, 2014; Sitzmann, Ely, Brown, & Bauer, 2010; K. Sullivan & Hall, 1997; Zlatkin-Troitschanskaia et al., 2015). In describing the peer-review process, Mutch, Young, Davey, & Fitzgerald (2018) argued that developing students' self-evaluation and reflection skills is a long-term process that should be embedded during the courses and constantly reinforced. To summarize, previous studies indicate certain problems in student self-assessment of competencies during their studies. However, the self-assessment helps students to develop the competency of evaluating the quality of their own work, which is among the important generic competencies at the workplace. Therefore, the model should help students to become aware of the importance of development of generic competencies during their studies and recognize the room for improvement. As such, it should include self-assessment to raise student awareness, but for the realistic assessment results, it would be necessary to include direct (teachers') assessment as well. Teachers' assessment should be done in a formative way as qualitative feedback supports student further learning and development to a greater extent than only quantitative feedback.

Another way to assess and evaluate the acquisition of generic competence is from the institutional point of view – whether the HEIs have provided students the opportunity to access certain competencies within regular curriculum or as a part of their co-curricular and extra-curricular activities.

In any case, one aspect that should definitely be included is ICT-supported assessment of key competencies, which can support both formative and summative assessment and can take many different forms such as portfolios, games, quizzes etc. Moreover, it is to be expected that the development of ICT in the near future will bring some new possibilities to support assessment, such as intelligent tutors, automated feedback etc. (Redecker, 2013).

### 5.3 When to assess and evaluate?

In their study about sustainable feedback, Mutch et al. (2018) concluded that “supporting students to develop self-evaluative skills cannot be achieved in the short term, but must be embedded in courses and consistently reinforced, with greater emphasis placed on the development of a dialogue around feedback that connects students with peers and educators.” Tuononen, Parpala, & Lindblom-Ylänne (2019), based

on the interviews with 57 graduates, found out that some graduates three years after graduation recognized that they have developed some competencies during their studies, which they were not aware of immediately after they have finished their studies and before being able to use them in real working-life. Zlatkin-Troitschanskaia et al. (2015) recognized three phases of competency assessment during the student lifecycle: admission test and assessing the prior knowledge, formative diagnostic individual assessment within courses and summative assessment of learning outcomes at the end of study process. The latest is the approach we would suggest for the case of Croatia – a longitudinal assessment of competencies from the freshmen year and each year afterwards until the graduation. The most appropriate assessment form should be suggested according to the particular situation at a certain higher education institution. It is important to include different methods, both formative and summative, as well as those supported with digital tools, with the main goal to encourage both students and teachers to think about the role of generic competencies.

Accordingly, to achieve maximum results, the assessment of student generic competencies should take place during the entire student lifecycle, including extra-curricular and co-curricular activities, both in a form of self-reflection and teacher assessment. In general, there are many papers on the assessment of generic and transversal competencies and their incorporation into single classes, but not on the methodology on the acquisition and assessment of those competencies during the entire student lifecycle, including extra-curricular and co-curricular activities. A significant work on this topic is presented within the project “How universities can best support students to develop generic skills: Enacting strategies for graduate employability” (Bennett, Richardson, & MacKinnon, 2016).

## Conclusion and further work

Based on the extensive literature review of relevant initiatives and research papers on the topic, this chapter brings the proposition of the future steps to be done on the assessment of generic competencies among ICT students in Croatia.

First, a simple form with a list of most important generic competencies from the employers' point of view will be created. As the focus is on the ICT domain, relevant research on the most desired competencies among employers employing ICT graduates will be consulted.

Secondly, the first assessment method to be used is student self-assessment, in a form of maturity model. This kind of assessment will enable students to see their current status and realize the potential for improvement, which is important for their further generic skills development within higher education.

Third, in order to enable students both the development of their generic skills in general and the development of self-assessment as a generic skill, they should be encouraged to conduct self-assessment as early as possible. We propose to start at their entry at a college, then after their freshmen year and each year afterwards.

The results of this proposed pilot study/is will show the further implementation challenges and next steps for further research work on the development of Croatian ICT students' generic skills and competences.

## References

- Barth, M. (2009). Assessment of key competencies – a conceptual framework. In *World in transition - sustainability perspectives for higher education*.
- Beneitone, P., & Bartolomé, E. (2014). Global generic competences with local ownership: a comparative study from the perspective of graduates in four world regions. *Tuning Journal for Higher Education*.  
[http://doi.org/10.18543/tjhe-1\(2\)-2014pp303-334](http://doi.org/10.18543/tjhe-1(2)-2014pp303-334)
- Bennett, D., Richardson, S., & MacKinnon, P. (2016). *Enacting strategies for graduate employability: How universities can best support students to develop generic skills, Final report 2016. Canberra, ACT: Australian Government, Office for Learning and Teaching, Department of Education and Training*.
- Bennett, N., Dunne, E., & Carre, C. (1999). Patterns of core and generic skill provision in higher education. *Higher Education*, 37, 71–93.
- Bridgstock, R. (2009). The graduate attributes we've overlooked: Enhancing graduate employability through career management skills. *Higher Education Research and Development*, 28(1), 31–44.  
<http://doi.org/10.1080/07294360802444347>
- Brown, P., Hesketh, A., & Williams, S. (2004). *The mismanagement of talent: Employability and jobs in the knowledge economy*. Oxford University Press.
- Bušelić, V. (2018). *Scientific discourse of information literacy and graduate employability*. University of Zagreb, Faculty of Humanities and Social Sciences.
- Bušelić, V. (2019). Information Literacy and Critical Thinking Freshman Course Experience. In *42nd International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)*.
- Bušelić, V., & Kovačević, Ž. (2016). High education study program model towards employability. On a way to understand Employer's requirements for Generic Competences. In *Central European Conference on Information and Intelligent Systems CECIIS* (pp. 107–115).
- Council for Aid to Education (CAE). (n.d.). Collegiate Learning Assessment (CLA). Retrieved May 9, 2019, from <https://cae.org/flagship-assessments-cla-cwra/cla/about-cla>
- Dacre Pool, L., & Sewell, P. (2007). The key to employability: developing a practical model of graduate employability. *Education + Training*, 49(4), 277–289.  
<http://doi.org/10.1108/00400910710754435>
- European Commission. (2012). *Rethinking Education: Investing in skills for better socio-economic outcomes*.
- Fastré, G. M. J., van der Klink, M. R., Sluijsmans, D., & van Merriënboer, J. J. G. (2013). Towards an integrated model for developing sustainable assessment skills. *Assessment & Evaluation in Higher Education*, 38(5), 611–630.
- Fazey, D. M. A. (1993). Self assessment as a Generic Skill for Enterprising Students the learning process.pdf. *Assessment and Evaluation in Higher Education*, 18(3), 235–250.
- Hall, D. T. (2004). The protean career: A quarter-century journey. *Journal of Vocational Behavior*, 65(1), 1–13.  
<http://doi.org/10.1016/j.jvb.2003.10.006>
- Hammer, S., Star, C., & Green, W. (2009). Facing up to the challenge: why is it so hard to develop graduate attributes? *Higher Education Research and Development*.
- Jackson, D. (2014). Self-assessment of employability skill outcomes among undergraduates and alignment with academic ratings. *Assessment and Evaluation in Higher Education*, 39(1), 53–72.  
<http://doi.org/10.1080/02602938.2013.792107>
- Jackson, D., & Chapman, E. (2012). Non-technical competencies in undergraduate business degree programs: Australian and UK perspectives. *Studies in Higher Education*, 37(5), 541–567.  
<http://doi.org/10.1080/03075079.2010.527935>
- Kallioinen, O. (2010). Defining and Comparing Generic Competences in Higher Education. *European Educational Research Journal*, 9(1).
- Kinash, S., Crane, L., Knight, C., Dowling, D., Mitchell, K., McLean, M., & Schulz, M. (2014). *Global graduate employability research: A report to the Business20 Human Capital Taskforce (Draft)*.
- Lee, D., Trauth, E., & Farwell, D. (1995). Critical

- Skills and Knowledge Requirements of IS Professionals: A Joint Academic/Industry Investigation. *MIS Quarterly*, 19(3), 313–340.
- Liu, O. L., Frankel, L., & Crofts Roohr, K. (2014). *Assessing Critical Thinking in Higher Education: Current State and Directions for Next-Generation Assessment*.
- Mauher, M., Slamić, M., Meštrović, K., Malčić, G., Vujić, J. Ž., Arbutina, D., ... Kapović, A. (2015). *Analiza i projekcija potreba realnog i javnog sektora - studija*.
- Mutch, A., Young, C., Davey, T., & Fitzgerald, L. (2018). A journey towards sustainable feedback. *Assessment and Evaluation in Higher Education*, 43(2), 248–259. <http://doi.org/10.1080/02602938.2017.1332154>
- National Board of Employment Education and Training, & Higher Education Council (Australia). (1992). *Achieving quality, higher education*. Canberra: Australian Govt. Pub. Service.
- Nusche, D. (2008). Assessment of learning outcomes in higher education: a comparative review of selected practices. *Innovación Educativa*. <http://doi.org/10.1787/244257272573>
- OECD. (2011). *Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo)*.
- Pažur Aničić, K., & Arbanas, K. (2015). Right Competencies for the right ICT Jobs – case study of the Croatian Labor Market. *TEM Journal*, 4(3), 236–243.
- Pažur Aničić, K., Bedeniković, M., & Smetiško, N. (2017). Which are the most desired e-competences of future ICT professionals? *28th Central European Conference on Information and Intelligent Systems (CECIIS)*.
- Pažur Aničić, K., Divjak, B., & Arbanas, K. (2017). Preparing ICT Graduates for Real-World Challenges: Results of a Meta-Analysis. *IEEE Transactions on Education*, 60(3), 191–197.
- Pegg, A., Waldock, J., Hendy-Isaac, S., & Lawton, R. (2012). *Pedagogy For Employability*. The Higher Education Academy.
- Redecker, C. (2013). *The Use of ICT for the Assessment of Key Competences*.
- Rodzalan, S. A., & Saat, M. M. (2012). The Effects of Industrial Training on Students' Generic Skills Development. *Procedia - Social and Behavioral Sciences*, 56(Ictthe), 357–368. <http://doi.org/10.1016/j.sbspro.2012.09.664>
- Shavelson, R. J., Marino, J., & Zlatkin-Troitschanskaia, O. (2019). Assessment of University Students' Critical Thinking: Next Generation Performance Assessment. *International Journal of Testing*.
- Sitzmann, T., Ely, K., Brown, K. G., & Bauer, K. N. (2010). Self-Assessment of Knowledge: A Cognitive Learning or Affective Measure? *Academy of Management Learning & Education*, 9(2), 169–191.
- Sullivan, K., & Hall, C. (1997). Introducing students to self-assessment. *Assessment and Evaluation in Higher Education*, 22(3), 289–305. <http://doi.org/10.1080/0260293970220303>
- Sullivan, S. E., & Arthur, M. B. (2006). The evolution of the boundaryless career concept: Examining physical and psychological mobility. *Journal of Vocational Behavior*, 69(1), 19–29. <http://doi.org/10.1016/j.jvb.2005.09.001>
- Tomlinson, M. (2008). “The degree is not enough”: students' perceptions of the role of higher education credentials for graduate work and employability. *British Journal of Sociology of Education*, 29(1), 49–61. <http://doi.org/10.1080/01425690701737457>
- Tremblay, K., Lalancette, D., & Roseveare, D. (2012). *Assessment of Higher Education Learning Outcomes (AHELO) Feasibility Study Report, Volume 1 - Design and Implementation*.
- Tricot, A., & Sweller, J. (2014). Domain-Specific Knowledge and Why Teaching Generic Skills Does Not Work. *Educ Psychol Rev*, 26, 265–283.
- Tuning Educational Structures in Europe. (2010). *A Tuning Guide to Formulating Degree Programme Profiles, Including Programme Competencies and Programme Learning Outcomes* (Vol. 36). Bilbao, Groningen and The Hague.
- Tuononen, T., Parpala, A., & Lindblom-Ylänne, S. (2019). Graduates' evaluations of usefulness of university education, and early career success—a longitudinal study of the transition to working life. *Assessment and Evaluation in Higher Education*, 2938. <http://doi.org/10.1080/02602938.2018.1524000>
- van der Lans, R. M. (2018). On the “association between two things”: the case of student surveys and classroom observations of teaching quality. *Educational Assessment, Evaluation and Accountability*. <http://doi.org/10.1007/s11092-018-9285-5>
- Yorke, M., & Knight, P. T. (2005). *Embedding employability into the curriculum. Learning and Employability*.
- Zlatkin-Troitschanskaia, O., Pant, H. A., Kuhn, C., Toepper, M., & Lautenbach, C. (2016). *Assessment Practices in Higher Education and*

Results of the German Research Program  
Modeling and Measuring Competencies in  
Higher Education (KoKoHs). *Research &  
Practice in Assessment*.

Zlatkin-Troitschanskaia, O., Shavelson, R. J., &  
Kuhn, C. (2015). The international state of  
research on measurement of competency in  
higher education. *Studies in Higher Education*,  
40(3), 393–411.  
<http://doi.org/10.1080/03075079.2015.1004241>