

Development of Competences and Teaching-Learning Arrangements in Higher Education

Hilde Schaeper
HIS Higher Education Information System
schaeper@his.de

Research questions

- Did the Bologna reforms enhance the acquisition of key competences while simultaneously maintaining a high level of subject-specific competences?
 - ➔ Comparison of acquired competences between graduates of traditional and new degree courses in Germany
 - Traditional degrees (one-tier degree structure): “Diplom” (delivered by universities and universities of applied sciences, “Magister” (mainly awarded in the humanities and by universities only), state examination (mainly for the teaching, medical and legal profession; possible only at universities)
 - New degrees (two-tier degree structure): bachelor’s degrees
- Which approaches to teaching and learning foster the development of competences?
 - ➔ Analysis of the impact of teaching-learning arrangements and the quality of teaching on the self-reported level of competences graduates of German higher education institutions (HEI) possessed at time of graduation

Key competences in higher education

- Bologna process: increased emphasis on key competences as a desirable learning outcome
- Key competences are not explicitly mentioned in the official documents on the Bologna process.
- One of the aims of the Bologna process is to enhance the employability of higher education (HE) graduates.
- Key competences are considered to be a means for achieving employability and, hence, to be an implicit objective.

Key competences

- Combine cognitive and non-cognitive components
- Are not inherited but can be learned (and, to a varying extent, taught)
- Are multifunctional
 - ➔ “The term generally refers to multi-functional and transdisciplinary competencies that are useful for achieving many important goals, mastering different tasks, and acting in unfamiliar situations.” (Weinert 2001b, p. 52)
- Are important
 - ➔ “... the notion of key competencies is used ... as a synonym for critical or important competencies ... that contribute to a successful life and a well-functioning society, are relevant across different spheres of life, and are important for all individuals.” (Rychen & Salganik 2003, p. 54)
- Are to be analytically distinguished from field-specific competences that are related to and are important for specific tasks/occupations
- Are often classified into four categories: social competence, self competence, methodical competence, and generally applicable domain-related competence

Data set

- Panel survey of higher education graduates who earned their first degree at a German higher education institution in the academic year 2005
- First interview (postal questionnaire), carried out on an average of twelve months after graduation
- 11,786 survey participants
 - ➔ 10,162 with a traditional degree (all types of HEIs and subject areas)
 - ➔ 1,624 with a bachelor's degree (selected subject areas)
- Reduced sample used for analysis: subject groups with a sufficient number of cases ($n = 5,369$)
 - ➔ 3,981 graduates of traditional degree programmes
 - ➔ 1,624 graduates of bachelor's degree courses

Measurement of competences

- Self-assessment of the level of competences possessed at time of graduation
- 24 abstract items (e. g. ability to cooperate, working independently), measured on a 5-point Likert scale ranging from 1 “low extent” to 5 “high extent”
- Factor analysis yielded four sufficiently reliable/consistent factors (Cronbach’s Alpha: 0.69 to 0.81)
- Analysis of selected competences

Competences selected for analysis

- Key competences
 - ➔ Methodical competence (additive index consisting of 5 items, e. g. working independently, problem-solving ability, analytical ability)
 - ➔ Social competence (additive index based on 6 items, e. g. ability to cooperate, conflict management, ability to communicate, leadership)

- Field-specific competences
 - ➔ Specialised subject-specific knowledge (single item)
 - ➔ Knowledge of scientific methods (single item)

Level of competences and type of degree

- OLS regression of competence level on type of degree (unstand. coeff.)
controlling for subject area, type of HEI, indicators of competences at entering higher education and of work experience during HE

Competences	Bachelor's vs. traditional degree		R square (full model)
	Effect at universities of applied sciences	Effect at universities	
Specialised subject-specific knowledge		-0,20 **	0,03
Knowledge of scientific methods		-0,15 **	0,07
Methodical competence		-0,07 **	0,05
Social competence	+0,16 **	+0,15 **	0,06

* p < 0,05 ** p < 0,01

HIS Graduates Survey 2005, 1st panel wave

- At universities: graduates with a bachelor's degree report a lower degree of field-specific and methodical competences
- Graduates with a bachelor's degree report a higher degree of social competences
- Some effects are small; poor explanatory power of the models

Key competences and field-specific competences

- Finding that graduates with a bachelor's degree report a higher degree of social competence indicate that curricula and/or the teaching-learning environment were re-designed in order to enhance the acquisition of key competences.
- Finding that university graduates with a bachelor's degree report a lower level of field-specific competences was expected ...
 - ➔ Bachelor's programmes at universities are considerably shorter than traditional university programmes (differences at university of applied sciences are less pronounced)
 - ➔ Curricula of bachelor's programmes at universities are less scholarly oriented than curricula of traditional degree courses
- ... but is problematic

Key competences and field-specific competences

- Action competence = field-specific competences + key competences

Results of research in cognitive psychology: Experts and novices differ first and foremost in their declarative knowledge ("know what") and their procedural knowledge ("know-how"); general abilities (e. g. intellectual abilities, learning strategies) play a less important role. An expert is characterised by a broad, well structured, integrated, and flexible base of knowledge, acquired over a long time (and through intense exercise) (Weinert 1998, p. 28).

- Key competences do not substitute for domain-specific competences:

"Generally, key competencies cannot adequately compensate for a lack of content-specific competencies." (Weinert 2001b, p. 53)

- Designing educational processes: no trade-off between key competences and field-specific competences

Measurement of approaches to/quality of teaching (examples)

- Quality of teaching, rated on a 5-point scale ranging from 1 “very poor” to 5 “very good” (selected aspects)
 - ➔ Interaction with faculty (additive index composed of 3 items, e. g. contact with teaching staff, academic guidance and support)
 - ➔ Academic quality of teaching (additive index consisting of 2 items, e. g. learning of state-of-the art scientific methods)
 - ➔ Practice orientation of teaching (additive index based on 4 items, e. g. integration of theory and practice, learning to act professionally)
- Didactic approaches to teaching (selected aspects)
 - ➔ Activation (additive index of 4 items, e. g. active participation of the students was encouraged; range from 1 “not applied” to 5 “applied in (almost) all courses”)
 - ➔ Participation in project courses (no/yes)
- Special courses on key competences (selection)
 - ➔ Social skills course (not attended/attended)
 - ➔ Course on rhetoric and presentation skills (not attended/attended)

Level of competences and approaches to teaching

- OLS regression of competence level on approaches to teaching (selection, unstand. coeff.), controlling for type of degree, subject area, type of HEI, indicators of competences at entering higher education and of work experience during HE

Approaches to/ quality of teaching (selection)	Specialised subject-specific knowledge	Knowledge of scientific methods	Methodical competence	Social competence
Interaction with faculty	+0,05 **		+0,03 **	
Academic quality of teaching	+0,12 **	+0,11 **	+0,08 **	
Practice orientation	+0,19 **		+0,07 **	+0,16 **
→ Activation			+0,05 *	+0,09 **
→ Project course		+0,05 *	+0,04 *	+0,06 **
Social skills course				+0,06 *
Rhetoric course				+0,06 **
→ R square (full model)	0,12	0,27	0,17	0,19
* p < 0,05 ** p < 0,01 HIS Graduates Survey 2005, 1st panel wave				

- Significant increase in R square indicating the relevance of teaching-learning arrangements for competence acquisition
- The effects of activating teaching methods are small; they mostly do not enhance the development of field-specific competences.

Activating teaching methods and competence development

- According to constructivist learning theories activating teaching-learning arrangements should considerably enhance both the acquisition of key competences and field-specific competences.
- Empirical evidence for this theoretical assumption: „Activating learning methods are effective in both, the acquisition of discipline-specific competencies and the acquisition of generic competencies.“ (Meng & Heijke 2005)
- Do our results disprove the theoretical model?
- Peculiarities of the data: high correlation between indicators of teaching methods and the assessment of the quality of teaching (problem that partial effects are difficult to determine, imprecise estimation possible)
- Regression analyses excluding variables that represent the quality of teaching
 - ➔ Student-centred activating teaching methods prove to assist in developing field-specific and key competences.
 - ➔ Regression coefficients are significant for all target variables and of considerable size.

Conclusion

- Effectiveness of activating teaching methods is not a new, surprising insight.
- But as regards key competences, German higher education institutions focus on special courses (e. g. social skills courses, courses on rhetoric and presentation skills, courses on management and organisational skills).
- Findings presented above suggest that stand-alone courses contribute to the acquisition of key competences. But they are less efficient than activating teaching methods and do not increase the level of field-specific competences.
- In view of the tight schedule of the new bachelor's programmes a consequent shift to student-centred, activating teaching and learning, a radical new teaching and learning culture seems to be more promising.

Thank you for your attention!