

Globalization Competences in Information Systems and E-Learning

Jan M. Pawłowski¹, Philipp Holtkamp¹, Hendrik Kalb²,

¹ University of Jyväskylä, Global Information Systems, PO Box 35, 40014 Jyväskylä, Finland
{jan.pawlowskilphilipp.holtkamp}@jyu.fi

² Technical University Dresden, Business Informatics, D-01062 Dresden, Germany
hendrik.kalb@tu-dresden.de

Abstract. Internationalization and globalization competences play a major role for graduates and employees in IS related enterprises. In contrast to other disciplines such as Business or Economics, the IS discipline rarely addresses this competence area. In the paper, we identify generic competence areas: coordination, communication, and cooperation. We derive domain specific competences for the field of E-Learning in Higher Education. The paper concludes with an outlook of promising research areas to foster and intensify research in the domain.

Keywords: Globalization, globalization competence, curriculum development, E-Learning competences

Introduction

Globalization competences contain skills, abilities and attitudes to successfully act in globally distributed settings. This paper describes requirements for graduates in the field of Information Systems (IS) and proposes research trends in the field.

With the globalization of business processes, development, supply and production chains the requirements towards individuals have changed dramatically. Organizations and individuals are exposed to new global challenges, e.g. cultural differences, languages, geographical dispersion, loss of communication richness, coordination breakdown, loss of team awareness etc. Therefore companies and national economies will only be successful on the long term if Higher Education and training organizations prepare current and coming workers as good as possible for these challenges.

In the domain of Information Systems, recent curricula focus mainly on knowledge and methods in the specific subjects [1]. The development of soft skills like presentation and team work is included but the integration of skills for working in globalized environments and international teams stay behind. Therefore, we need new kinds of programs for the specific tasks of internationalization and should integrate the additional objectives in existing courses and skill development.

In previous work [1], we have identified two generic competence fields which can support the preparation of individuals for global distributed working environments:

- Computer /ICT literacy: The importance of computer literacy and e-skills is well documented and also reflected in recent policies within Europe [2].

However, curricula in schools and universities still focus on localized approaches and do rarely take the global dimension into account [3][4].

- Intercultural competences: As a second main area, competences to act in intercultural settings have to be considered. This field focuses on different aspects, such as intercultural management or communication aspects [5].

To acquire necessary competences, the current and coming academic workforce should be prepared in Higher Education for future global work settings. This should be achieved by both, specialized courses as well as in integrated existing courses and exercises. Therefore, existing curricula have to be extended to include these new requirements.

In this paper, we analyze relevant areas and competences by an analysis of current curricula. We identify gaps and requirements for potential globalized curricula. After the identification of required competences, we outline an example how such a generic curriculum framework can be applied to the domain of Technology-Enhanced Learning (TEL). We conclude with an outlook, proposing research directions.

International Aspects of IS Curricula

How are global settings currently addressed in Higher Education in different disciplines? This is the main question we address in this section.

As a first step, curricula can be analyzed regarding global competences, as Higher Education institutions as well as corporate training are affected by the influences of globalization [3]. The need for globalization competences becomes even more important when working in developing countries [6] which is often the case in particular when organizations choose offshore outsourcing models.

Current curricula in IS education programs are in many cases focused on purely domain specific knowledge. For the Anglo-American area, model curricula have been developed outlining key aspects and contents of the domain [7][8]. Those curricula reflecting the current status of learning and teaching rarely take globalization aspects into account. The current ACM model curriculum on Management Information Systems addresses globalization issues in many fields such as policy, market organizational issues [7] but does not address corresponding competences. As a further example, the German model curriculum for Business Information Systems [9] does not even address the topic of globalization or globally distributed work.

To identify generic competences and to analyze global needs, we use the model curriculum structure and guidelines for undergraduate [8] and graduate degree programs [7] of ACM. Information systems graduates need the following high-level IS capabilities which are based on knowledge and skills in the three categories IS-specific knowledge and skills, foundational knowledge and skills, and domain fundamentals [8]:

- Improving Organizational Processes,
- Exploiting Opportunities Created by Technology Innovations,

- Understanding and Addressing Information Requirements,
- Designing and Managing Enterprise Architecture,
- Identifying and Evaluating Solution and Sourcing Alternatives,
- Securing Data and Infrastructure, and
- Understanding, Managing and Controlling IT Risks.

Global aspects are partially labeled in IS-specific knowledge and skills, e.g. in case of customizing processes to address cultural and ethnic needs or for the evaluation of sourcing and offshoring decisions. However, a greater focus can be found in the foundational knowledge and skills that are not unique to Information Systems as a discipline, e.g. leading cross-functional global teams and managing globally distributed projects [8]. Nevertheless, most of the other concepts like Designing and implementing information systems solutions (IS-specific skills) or Communication & Negotiation (foundational skills) will be strongly influenced by global needs.

A master's program in information systems aims on the following competences:

- “A core of IS management and technology knowledge
- Integration of IS and business foundations
- Broad business and real world perspective
- Communication, interpersonal, and team skills
- Analytical and critical thinking skills
- Specific skills leading to a career” [7]

The model curriculum also refines the competences for different career tracks. The topics are summarized as following [7]:

- IT Infrastructure
- Analysis, Modeling, and Design
- Enterprise Models
- Emerging Technologies and Issues
- Project and Change Management
- Strategy and Policy
- Implications of Digitization
- HCI
- Integrated Capstone

Each competence could be measured regarding the level of Knowledge / Competences. These levels are (0) no knowledge, (1) awareness, (2) literacy, (3) concept/Use, (4) detailed Understanding and (5) advanced. For undergraduates only the level 1 to 4 are used [8]. It is clear that all of those topics are affected by global aspects and need to be refined in terms of globalization issues.

As a conclusion, the a globalized IS curriculum needs to be refined for:

- Different career tracks and levels,
- IS subjects and topics,
- General globalization competences.

Competences in global processes

Whereas the last section focused on the analysis of curricula, we have also analyzed current practice in international projects in the domain of global software development and international collaborative work.

Carmel [10] defines five main barriers for distributed teams: geographical dispersion, loss of communication richness, coordination breakdown, loss of team awareness, cultural differences. Evaristo et al. [11] extend Carmel's approach and identify the following influence factors for global teams: trust, level of dispersion, type of stakeholders, type of projects, synchronicity, complexity, systems methodology, perceived distance, policy and standards, culture. This very comprehensive classification gives an orientation which challenges are faced by organizations and individuals in a global work context. In a following publication, Prikladnicki, Audy, & Evaristo [12] provide also recommendations for global organizations. In particular, a well managed (maturing) process, careful preparation, and continuous knowledge exchange can positively influence global projects and work processes. Furthermore, the competences of individuals and stakeholders in the process play a crucial role. This regards mainly the ability to manage and communicate in intercultural teams [13].

One crucial aspect is the exchange and distribution of knowledge [14]. Global knowledge sharing is still a challenging but highly significant task. Global organizations or temporary partnerships work distributed all over the globe – more and more study programs include learners from all over the world in E-Learning study programs like the one addressed in this paper. This means that globally distributed teams need to be supported to work effectively and efficiently.

Based on these approaches, the following influence fields can be derived. For each field, we briefly outline the challenges for individuals in the field of Global Information Systems as well as the key aspects for the corresponding training instruments.

1. **Culture:** Cultural aspects are a crucial success factor for Global Information Systems. Different levels of culture (e.g., national, regional, organizational, [15]) influence work and learning processes. Individuals need to be prepared to analyze, reflect, and react towards their partners' and their own cultural characteristics. In training settings, cultural aspects regarding the contents, communication, or learning styles need to be considered [16].
2. **Coordination and Communication:** In distributed teams, heterogeneous values, norms, and behavior can lead to problem situations, conflicts, and misunderstandings. Common ways of communication need to be agreed and facilitated. Additionally, coordination mechanisms (also addressed in international project management) need to be defined and performed. For training settings, this means that learning scenarios need to be adapted, in particular for collaborative learning settings.
3. **Knowledge Management** plays a crucial role for the success of Information Systems, in particular when work processes are coordinated around the globe. Therefore, supporting instruments and mechanisms need to be defined to

continuously enable and ensure knowledge transfer between the stakeholders involved.

4. **Collaboration** and the application of **inter- and cross-cultural skills** need to be assured in all parts of work settings. Training settings should take those key competences into account when preparing individuals to act in global settings.

Those key aspects should be incorporated in a framework for global IS competences.

Towards an Internationalized IS Curriculum

As identified in the previous sections, the main competences necessary for internationalization can be summarized under computer-related and intercultural competences. To support the work in global distributed work settings we can further summarize the above mentioned competences into the fields of **communication**, **coordination** and **cooperation**.

Coordination could also be seen in a generic way as the project management within a groupwork. The application of the internationalization competences to this three fields lead to the required skills. Meaning, in an international setting the communication, the collaboration and the project management related tasks and functions will change and require different set of competences. So cultural influence factors and also the IT environment for all three will change.

Considering education for individuals confronted with internationalization, besides these three sectors the domain specific knowledge is of crucial importance. In the domain specific knowledge the background and theory part will stay the same but the execution of specific tasks may change, e.g. the monitoring of distributed groups will need a different skill set than the monitoring of a local group. Therefore the methods and contents to teach and to learn the domain specific competences are heavily influenced by the sought internationalization competences. This could be represented depending on the domain e.g. in multi-national case studies, transnational groupwork during the exercises, etc.

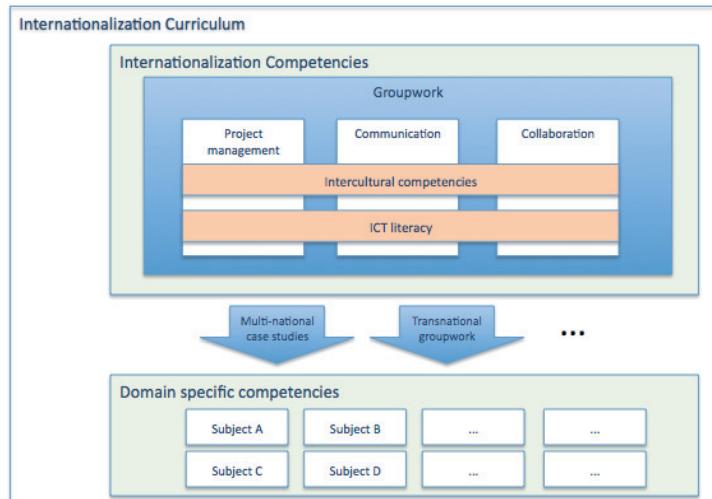


Figure 1: Internationalization Curriculum

This framework, however, only describes the key aspects and main tracks of internationalized IS education. It needs to be adapted to career tracks (e.g. global software project manager, CIO, programmer) and to specialized sub-domains.

Case Study: International E-Learning

To show the use of such a generic model, we will show the application of the framework within the domain of e-Learning and Knowledge Management. In the example we will use the settings of the European project TeaCamp, which deals with virtual mobility within Europe.

Two main competences for internationalization are intercultural and computer-related competences. These will be addressed in our setting within courses regarding culture models and international online groupwork. The target of these courses will be to support the internationalization of project management, communication and collaboration and to give individuals the main necessary understanding of required skills. As domain specific topics we identified the following issues in the project context:

- Learning Strategies
- E-Assessment Strategies
- Advanced Learning Technologies
- Collaborative Online Groupwork
- Information Literacy

In the international context of a virtual mobility activity, these domain specific topics will be influenced by the additional international competences. As an example,

learning or assessment strategies differ significantly [17]. Therefore, it is necessary to develop generic intercultural and international competences and apply those to the domain specific topics as well. A basis can be the use of culture models ([15][16][17]) to acquire internationalization competences and to identify their influences on the technology-related subjects.

Based on this general idea, the curriculum structure is described in the following figure.

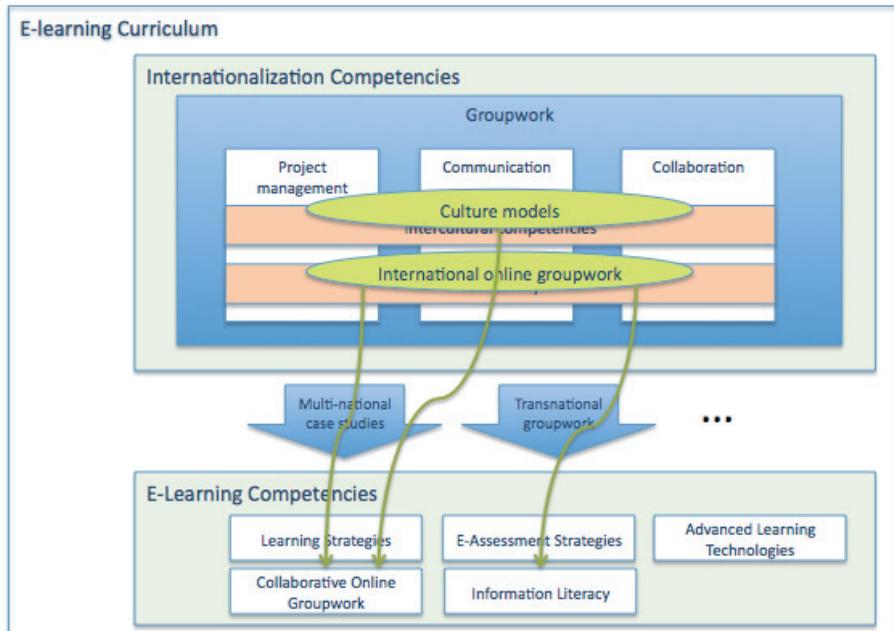


Figure 2: E-learning Curriculum

Due to the fact, that intercultural competences are influencing also the domain specific topics, e.g. international e-assessment might be different from national e-assessment due to different regulations and preferences, we propose, that the topics introduced in the section culture models will be taken into consideration in all other parts as well.

This adaptation of the general curriculum shows one implementation. It has been successfully used to develop a curriculum in a project setting. For a broader curriculum on Technology-Enhanced Learning, a more general approach should be applied, focusing on the full sub-domain [18]. However, the main work is still in progress: Identifying specific curricula for different sub-domains and career tracks.

Conclusion and Future Research

This paper has identified requirements and potentials for internationalizing education in IS education, in particular for knowledge-intensive domains such as E-Learning or Knowledge Management. Based on the theoretical foundations, we have derived a sample curriculum and suggestions for didactic embedding and planning of those learning activities.

Based on the analysis, several research strands can be derived:

- Development of theories and models describing globalized IS competences,
- Identification of general competences in globalized curricula,
- Adaptation of the general framework to sub-domains and career tracks,
- Development of specific country profiles, integration of national curricula,
- Application of culture related theories and models to sub-domains,
- Method development for HR management in global settings for IS professions.

This list should not be seen as complete. It shall serve as a basis for the discussion to intensify acresearch in the proposed field and to stimulate discussions on research potentials.

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