

A COMPARATIVE STUDY OF THE RELATIONSHIP BETWEEN SOCIAL DIMENSION OF WEB 2.0 TECHNOLOGIES AND E-LEARNING: STUDENTS' VIEW IN GERMANY AND TAIWAN

Andreas Ahrens¹, Melody Ling-Yu Wen², Ya-Hui, Huang³, Jeļena Zaščerinska⁴ and Olaf Bassus⁵

¹Hochschule Wismar, University of Applied Sciences: Technology, Business and Design, Faculty of Engineering, Wismar, Germany
Email: andreas.ahrens@hs-wismar.de

²National Changhua University of Education, Department of Business Education, Changhua City, Taiwan, R. O. C.
Email: melodywen@mail.ypu.edu.tw

³Yuanpei University, Department of Business Administration, Hsinchu City, Taiwan, R. O. C.
Email: jamie6123@gmail.com

⁴Hochschule Wismar, University of Applied Sciences: Technology, Business and Design, Faculty of Business, Wismar, Germany
Email: knezna@inbox.lv

⁵Hochschule Wismar, University of Applied Sciences: Technology, Business and Design, Faculty of Business, Wismar, Germany
Email: olaf.bassus@hs-wismar.de

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Abstract. The social dimension of Web 2.0 penetrates our society more thoroughly with the availability of broadband services. Aim of the following paper is to analyze the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning within education. The meaning of the key concept of *social dimension of Web 2.0* is studied. Moreover, the study demonstrates how the key concept is related to the idea of *e-learning*.

Research methodology is based on the theoretical findings on the social dimension of Web 2.0 (Vossen, 2009; Tapscott, Williams, 2006; Berners-Lee, 2000) and the relationship between social dimension of Web 2.0 technologies and e-learning (Maslo, 2007; Zaščerinska, 2009a). The methodological foundation of the present research for the comparative analysis of the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning is formed by the System-Constructivist theory.

The present empirical research was conducted during the implementation of Bachelor's programmes at the Faculty of Business and Engineering at Wismar University, University of Technology, Business and Design, Germany, and the nationwide of Taiwan. The comparative study results suggest that the students in Taiwan have a higher level of the positive view on the relationship between social dimension of Web 2.0 technologies and e-learning than the engineering and business students of Wismar University in Germany. The findings of the research allow putting forth the following hypothesis for further studies: in order to increase the students' e-learning within the social dimension of Web 2.0 it is necessary to promote the students' use of the social dimension of Web 2.0 for organizational and professional

purposes, as well as to create a favourable learning environment which supports learners' needs and provides successful e-learning within the social dimension of Web 2.0 in a multicultural environment.

Keywords: *E-learning, Social Dimension of Web 2.0 for Individual, Organizational and Professional Purposes*

1. Introduction

Web 2.0 is jointly formed by four dimensions, namely, the infrastructure dimension, the functionality dimension, the data dimension, and the social (or socialization) dimension. Socialization, described as taking software or even user-generated content and sharing or jointly using it with others, covers the aspect of user-generated content as it occurs in blogs or wikis, in tagging as well as in social bookmarking (Vossen, 2009, p. 38). Skype, Classroom Management Systems, the eBay seller evaluation, the Amazon recommendation service, or Wikipedia (Vossen, 2009, p. 38), where the increased data exchange within the system is no longer a limiting parameter with the current developments in the infrastructure, are classical examples and have found widespread acceptance in the community. The social dimension of Web 2.0 penetrates our society more thoroughly with the availability of broadband services. However, the success of the social dimension of Web 2.0 in education requires students' view to be considered.

Aim of the following paper is to analyze the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning within education. The meaning of the key concept of *social dimension of Web 2.0* is studied. Moreover, the study demonstrates how the key concept is related to the idea of *e-learning*. The study presents how the steps of the process are related: determining *social dimension of Web 2.0* → revealing the relationship between social dimension of Web 2.0 technologies and e-learning → carrying out the empirical study within a multicultural environment.

The paper is organized as follows: The introductory state-of-the-art section demonstrates the authors' position on the topic of the research. Section 3 introduces the social dimension of Web 2.0. The relationship between social dimension of Web 2.0 technologies and e-learning within education is studied in Section 4. The associated empirical results are presented and interpreted in Section 5. Finally, some concluding remarks are provided in Section 6.

2. State-of-the-Art

The modern issues of global developmental trends emphasize "a prime importance in sustainable development that is to meet the needs of the present without compromising the ability of future generations to meet their own needs" (Zimmermann, 2003, p. 9). Thus, sustainable personality, and, consequently, user of the social dimension of Web 2.0, is "a person who sees relationships and inter-relationships between nature, society and the economy" (Rohweder, 2007, p. 24). In other words, this is a person who is able to develop the system of external and internal perspectives, and in turn the system of external and internal perspectives becomes a main condition for the sustainable user of the social dimension of Web 2.0 to develop. For instance, the concern of the European Union, namely, to become "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" (European Commission, 2004, p. 2), demonstrates the significance of developing the system of external and internal perspectives for the development of humans, institutions and society. Thus, the life necessity to develop the system of two perspectives, namely, external and internal, determines the research methodology of the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning in education on the pedagogical discourse, as highlighted in Figure 1.

However, in real life sustainable user of the social dimension of Web 2.0 is often realized from one of the perspectives: from the internal perspective accentuating cognition (Vossen, 2009), from the external perspective accentuating social interaction (Tapscott, Williams, 2006) and finding a balance between the external and internal perspectives (Surikova, 2007).

The methodological foundation of the present research on the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning is formed by the System-Constructivist Theory based on Parson's system theory (Parson, 1976) where any activity is a system, Luhmann's theory (Luhmann, 1988) which emphasizes communication as a system, the theory of symbolic interactionism (Mead, 1973; Goffman, 2008) and the theory of subjectivism (Groeben, 1986). The system-constructivist approach to learning emphasizes that human being's point of view depends on the subjective aspect (Maslo, 2007, p. 44): everyone has his/her own system of external and internal perspectives (Figure 1) that is a complex open system (Rudzinska, 2008, p. 366), and experience plays the central role in a

construction process (Maslo, 2007, p. 42). Thus, four approaches to the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning are revealed, namely, from the internal perspective accentuating cognition, from the external perspective accentuating social interaction, finding a balance between the external and internal perspectives and developing the system of the external and internal perspectives. Therein, the fourth approach, namely, developing the system of external and internal perspectives, is considered to be applicable to the present research on the students' view on the relationship between the social dimension of Web 2.0 technologies and e-learning.

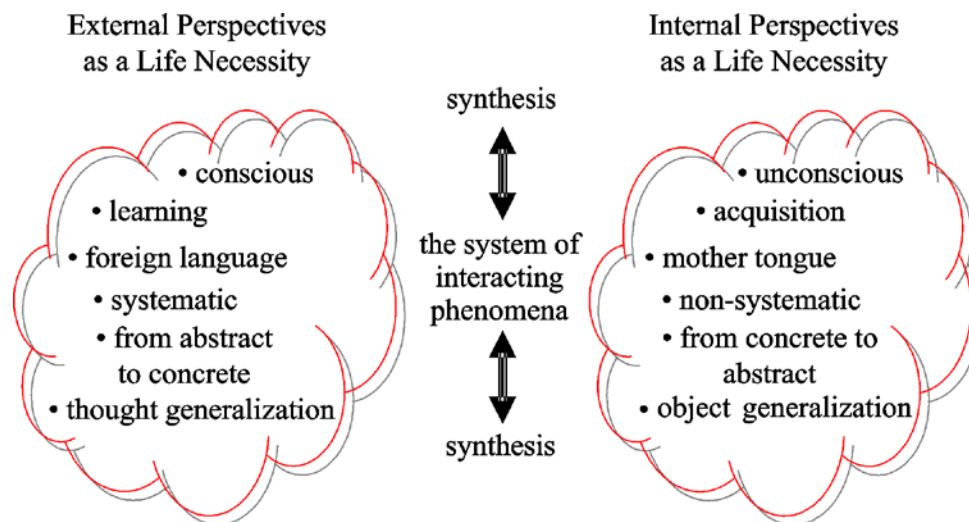


Figure 1. Developing the system of external and internal perspectives as a life necessity

3. Social Dimension of Web 2.0

The paradigm change, namely, the move towards mass collaboration (Tapscott, Williams, 2006) and/or mass socialization (Vossen, 2009, p. 38) – from person to people and from systems to service (Jones, 2008), puts the emphasis on the use of the social dimension of Web 2.0.

Typical social dimension of Web 2.0 techniques and technologies include “social software” and online social networks (Vossen, 2009, p. 38-39).

“Social software” is defined by Vossen (Vossen, 2009, p. 38) as software that gets better (or at least more useful) the more people use it. While most of the time the software itself, i.e., the program system, does not change based on the number of its users or the frequency with which it is used, it is the application that the software is enabling. Examples include Skype, the eBay seller evaluation, the Amazon recommendation service, or Wikipedia. Especially the latter is a perfect example for what so-called mass collaboration (Tapscott, Williams, 2006) or crowdsourcing can achieve. There is also another impact that socialization can have, namely, that of improving some given software on a constant or perpetual basis. Traditionally, software has never been free of bugs, security holes, or errors, and it has been common for a software company to fix them and distribute new releases or versions of the software from time to time. The new approach is to do this at a much higher pace. Software on the Web may nowadays be in a permanent beta state of release and never finished. Thus, for outsiders maintenance occurs on a permanent basis. Such a state of perpetual beta may apply to a service that can only be accessed through an API (application program(ming) interface), in which case a user is not bothered by constant release changes, at least as long as the behaviour of the API is only extended, but not fundamentally modified.

Then, Vossen (Vossen, 2009, p. 38) considers that online social networks, another form of mass socialization today, bring a dimension to the Web that goes beyond simple links between pages; they add links between people and between communities. In such a network, direct links will typically point to our closest friends and colleagues, indirect links lead to the friends of a friend, and etc.

A social network on the Web is typically the result of employing some software that is intended to focus on building an online community for a specific purpose. Social networks connect people with common interests and may be as simple as a blog, or as complex as Facebook or MySpace for mostly private applications, as LinkedIn or Xing for professional applications, or as Twitter for both. The primary impact that the current Web developments are having in this area are that connecting people and communities constantly becomes easier, and it is not difficult anymore to maintain a professional or

personal network of buddies worldwide. Yet another impact is that a social network may open up novel sources of revenue, in particular through advertising. Finally, Vossen (Vossen, 2009, p. 38) underlines that two aspects should have become clear by the discussion so far: on the one hand, the most obvious change that has recently occurred on the Web is that it has changed from a pure read Web as designed by Berners-Lee (Berners-Lee, 2000) to a read/write Web, where users not only draw information from, but also add information to it. On the other hand, the dimensions we have discussed exhibit various overlaps. Indeed, technology enables functionality, which as a “byproduct” leads to data collections, and users have a new tendency to socialize over the Web, by exploiting that functionality and the technology. Hence, social dimension of Web 2.0 techniques and technologies, namely, “social software” and online social networks, are considered as an integral part of education.

4. The Relationship between Social Dimension of Web 2.0 and e-Learning

The change in specialist entering the service area, namely, not working permanently at a large-scale enterprise but accepting project-related orders of large-scale enterprises by free office (Bassus, Wolfgramm, 2009, p. 38) reveals the significance of the relationship between social dimension of Web 2.0 technologies and e-learning in the processes and environments of education.

Developing the idea of Vossen (Vossen, 2009, p. 38) on the use of Facebook or MySpace for private applications, and LinkedIn or Xing for professional applications, or Twitter for both, use of the social dimension of Web 2.0 is differentiated into the use of the social dimension of Web 2.0 for individual purposes, for organizational purposes and for professional purposes as shown in Figure 2.



Figure 2. Levels of needs analysis for individual purposes, for organizational purposes and for professional purposes

A proper use of the social dimension of Web 2.0 for individual, organizational and professional purposes is provided by e-learning in education based on the idea that all learning is part of a single process, an on-going process (Maslo, 2007, p.38). This finding suggests that e-learning is a part of a single learning process within education.

Hence, the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning has the potential to contribute decisively to the sustainable use of social dimension of Web 2.0 technologies for individual, organizational and professional purposes in education.

5. Empirical Results

This study is oriented towards the revealing of the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning whereas the research objectives were to analyze the relationships among the degree of involvement and e-learning capabilities while using Web 2.0 technologies to improve the learners’ competences and learning outcomes.

The present empirical research was conducted during the implementation of Bachelor’s programmes at the Faculty of Business and Engineering of Wismar University, University of Technology, Business and Design, Germany, and the nationwide of Taiwan.

The present empirical study involves three independent samples, namely,

- 40 bachelor students in Electrical Engineering at the Faculty of Engineering of Wismar University, University of Technology, Business and Design,
- 120 bachelor students in Business Law at the Faculty of Business of Wismar University, University of Technology, Business and Design, Germany and

- 193 undergraduate students of the nationwide of Taiwan.

193 undergraduate students of the nationwide of Taiwan were asked to complete the questionnaire. The Bachelor's programmes do not contain a special module on Web 2.0.

Then, 40 students at the Department of Electrical Engineering and Computer Science at the Faculty of Engineering of Wismar University, University of Technology, Business and Design were taken into consideration at the beginning of the seventh semester in the fourth year of their bachelor studies. The students have not got any or few work experience. The seventh semester of the Bachelor's program for Electrical Engineering and Computer Science at the Faculty of Engineering of Wismar University does not contain a special module on Web 2.0.

Finally, 120 bachelor students in Business Law at the Faculty of Business of Wismar University, University of Technology, Business and Design, Germany were taken into consideration at the beginning of the second semester in the first year of their bachelor studies. The bachelor students have not got any or few work experience. The second semester of the Bachelor's program in Business Law and Management at the Faculty of Business of Wismar University does not contain a special module on Web 2.0.

Analysis of the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning is based on the following questionnaire where the e-learning ability was taken into account for further evaluation:

- Question 1: Are you interested in e-learning?
- Question 2: Are you actively participating in e-learning activities?
- Question 3: Do you think you can learn easily by using e-learning?
- Question 4: Do you believe that the knowledge and skills you acquired through e-learning can increase the efficiency of problem solving?
- Question 5: Can you effectively integrate the knowledge and skills you acquired from e-learning?
- Question 6: Can you use the knowledge acquired from e-learning on problem solving efficiently?

The evaluation scale of seven levels for each question is given where "1" means "strongly disagree" and low level of experience in the use of social dimension of Web 2.0 technologies and "7" points out "strongly agree" and high level of the use of the social dimension of Web 2.0.

The survey of the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning by the students in Germany, highlighted in Table 1, reveals the following: the use of the social dimension of Web 2.0 by students is homogeneous as well as the students do not realize the possibilities offered by Web 2.0 properly.

Table 1: Statistical analysis of the questionnaires obtained from the Engineering and Business students of Wismar University

Question	Engineering Students		Business Students	
	Mean	Std. Deviation	Mean	Std. Deviation
1	4,46	1,630	5,03	1,629
2	3,54	1,860	4,37	1,712
3	3,96	1,661	3,37	1,245
4	3,62	1,675	3,47	1,106
5	3,73	1,564	3,53	1,224
6	3,62	1,416	3,40	1,070
Total	3,8		3,9	

The survey of the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning by the students in Taiwan, emphasized in Table 2, reveals that the use of the social dimension of Web 2.0 by students is homogeneous as well as the students do not realize the possibilities offered by Web 2.0 properly.

Table 2: Statistical analysis of the questionnaires obtained from the students in Taiwan

Question	Mean	Std. Deviation
1	4,21	0,959
2	4,40	1,070

3	4,30	0,996
4	4,39	1,182
5	4,51	0,954
6	4,70	1,310
Total	4,4	

The survey of the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning by the students in Germany and in Taiwan, emphasized in Table 3, reveals that the use of the social dimension of Web 2.0 by students is heterogeneous as well as the students do not realize the possibilities offered by Web 2.0 properly.

Table 3: Mean analysis of the questionnaires obtained from the students of Wismar University and of the nationwide of Taiwan

Question	Students of Wismar University	Students of the nationwide of Taiwan
1	4,74	4,21
2	3,96	4,40
3	3,66	4,30
4	3,54	4,39
5	3,63	4,51
6	3,51	4,70
Total	3,8	4,4

The comparison of the *Mean value* (Mean) shows that

- the engineering and business students of Wismar University demonstrate the homogeneous view (*Mean value – 3.8 and 3.9*) on the relationship between social dimension of Web 2.0 technologies and e-learning,
- the students in Taiwan have a higher level of the positive view (*Mean value – 4.4*) on the relationship between social dimension of Web 2.0 technologies and e-learning than the engineering and business students (*Mean value – 3.8*) of Wismar University in Germany.

The comparison of the *Standard Deviation* (Std. Deviation) results reveals that the scores of the engineering and business students of Wismar University in German are spread wider than the scores of the students in Taiwan.

Hence, the results of *Mean* and *Standard Deviation* within the survey of the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning in Germany and Taiwan reveal that most of answers are concentrated around Level 3 and 4 that means "agree". Thus, there is a possibility to increase the students' e-learning within the social dimension of Web 2.0.

Processing, analysis and interpretation of data gathered from the survey of the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning in the course of the present research emphasize that the students' view on the relationship between social dimension of Web 2.0 technologies and e-learning contributes to the use of social dimension of Web 2.0 by the students in education.

6. Discussion

The findings of the research allow putting forth the following hypothesis for further studies: in order to increase the students' e-learning within the social dimension of Web 2.0 it is necessary to promote students' use of the social dimension of Web 2.0 for organizational and professional purposes, as well as to create a favourable learning environment which supports learners' needs and provides successful e-learning within the social dimension of Web 2.0 in a multicultural environment. The recommendation here is the role of educators as mentors for student self-discovery and self-realization; to motivate students, to stimulate their interests, to help them to develop their own structure and style, as well as to help them to evaluate their performance and be able to apply these findings (Maslo, 2007, p. 45) to improve their further use of the social dimension of Web 2.0. The solution here to process, analyze and interpret gathered data objectively is to improve the questionnaire, to triangulate the methods of gathering data, i.e. students' educator evaluation and other educator evaluation, to evaluate the dynamics of each

student in the sample and to apply a variety of statistics tests. The recommendation here for an objective analysis is the role of educators as researchers (Zaščerinska, 2009b, p. 78) that is to develop continuously educators' experience in social interaction and cognitive activity.

References

- Bassus, O.; Wolfgramm, K.: The Innovative Entrepreneurship Training Program at Hochschule Wismar – University of Technology, Business and Design. In: Ahrens, A. and Lange, C. (Ed.), *First Asian Conference on e-Business and Telecommunications*, Berlin: Mensch & Buch, 2009, pp. 73-81
- Berners-Lee, T.: *Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web*. New York: Harper Collins, 2000
- European Commission: Implementation of “Education and Training 2010” Work Programme. *Working Group B “Key Competences”*, 2004
- Goffman, E.: *Rahmen-Analyse: Ein Versuch über die Organisation von Alltagserfahrungen*. Frankfurt: Suhrkamp, 2008
- Groeben, N.: *Handeln, Tun, Verhalten als Einheiten einer verstehend-erklärenden Psychologie*. Tübingen: Francke, 1986
- Jones, S.: The Move Towards Collaborative Business – From Person to People and From System to Service. *Capgemini Global Outsourcing*, 2008
- Luhman, N.: *Erkenntnis als Konstruktion*. Bern: Benteli, 1988, pp. 1-14
- Maslo, E.: Transformative Learning Space for Life-Long Foreign Languages Learning. *International Nordic-Baltic Region Conference of FIPLV Innovations in Language Teaching and Learning in the Multicultural Context*. Riga, Latvia, 2007, pp. 38-46
- Mead, G. H.: *Geist, Identität, und Gesellschaft*. Frankfurt: Suhrkamp, 1973
- Parson, T.: *Theorie sozialer Systeme*. Opladen: Westdeutscher Verlag, 1976.
- Rohweder, L.: What kind of Sustainable Development do we talk about? In: Kaivola, T. and Rohweder, L. (Ed.), *Towards Sustainable Development in Higher Education – Reflections*. Helsinki University Press, Finland, 2007, pp. 22-27
- Rudzinska, I.: The Quality of Aim Setting and Achieved Results in English for Specific Purposes-Study Course in Lecturers and Students' Opinion. *Proceedings of the ATEE Spring University Conference Teacher of the 21st Century: Quality Education for Quality Teaching*. University of Latvia, Riga, Latvia, 2008, pp. 366-374.
- Surikova, S.: Development of Criteria, Indicators and Level System for Evaluation of Enhancement of Primary School Students' Social Competence. In: *Society. Integration. Education*, Rezekne, Latvia, 2007, pp. 383-393
- Tapscott, D.; Williams, A.: *Wikinomics: How Mass Collaboration Changes Everything*. New York: Penguin Books, 2006
- Vossen, G. 2009. Web 2.0: a Buzzword, a serious Development, just Fun, or What? *International Joint Conference on e-Business and Telecommunications*. Milan, Italy, 2009, pp. IS33-IS40
- Zaščerinska, J.: Designing Teaching/Learning Activities to Promote e-Learning. In: Ahrens, A. and Lange, C. (Ed.), *First Asian Conference on e-Business and Telecommunications*, Berlin: Mensch & Buch, 2009 (a), pp. 22-35
- Zaščerinska, J.: Role of Teacher in the Era of e-Learning. In: Ahrens, A. and Lange, C. (Ed.), *First Asian Conference on e-Business and Telecommunications*, Berlin: Mensch & Buch, 2009 (b), pp. 73-81
- Zimmermann, B.: Education for Sustainable Development – Baltic 21. An Agenda 21 for the Baltic Sea Region. *Danish Ministry of Education*, 2003, pp. 1-147.