M.Sc. Psychology: Learning Sciences
Seminar P 1.2 „Introduction to learning, instruction, training and technology“
Lecturers: Prof. Dr. Frank Fischer, Prof. Dr. Jan-Willem Strijbos
Winter semester 2013
Wednesday, 8-10 h
Room 1305 (Leopoldstr. 13)

Seminar overview „Introduction to learning, instruction, training and technology“

Session	Date	Topic	Lecturer(s)
1.	16.10	Introduction & overview	Strijbos
2.	23.10	Three approaches to learning	Fischer & Strijbos
3.	30.10	Working memory and cognitive load	Strijbos
4.	06.11	Skill acquisition and expert performance	Fischer
5.	13.11	Situated cognition	Fischer
6.	20.11	Distributed cognition and shared cognition	Strijbos
7.	27.11	Worked examples and 4C/ID	Strijbos
8.	04.12	Multimedia learning and multiple representations	Fischer
9.	11.12	Scaffolding and tutoring	Fischer
10.	18.12	Collaborative learning	Fischer
11.	08.01	Problem-based learning and inquiry learning	Fischer
12.	15.01	Simulation-based learning	Fischer
13.	22.01	Community-based learning	Strijbos
14.	29.01	Wrap-up session	Fischer & Strijbos
15.		PBA-LS	

Organisation of the seminar

During this seminar you will familiarize yourself with theoretical foundations and instructional approaches in the broad domain of learning, instruction, training and technology. The exploration of each of the topics will take place through course readings, a presentation, and brief assignments. At the end of the seminar you will have gained knowledge on the theoretical foundations for current perspectives on learning, as well as on the respective instructional approaches.

Presentation

- The seminar consists of two large thematic blocks. The first block (sessions 2 thru 6) deals with theoretical foundations, and the second block (sessions 7 thru 13) deals with instructional approaches. There is a weekly foundational article and on (or more) further readings/articles. All participants read the foundational article for each topic. The further reading/articles only have to read by the students that will explore that topic in more detail.
- Students will be grouped in pairs or triads to explore one topic in more detail. Each group will thus organize one session, which includes (a) a presentation on the foundational article (10-15 min.), (b) a presentation on the further readings/articles (10-15 min., and (c) an interactive component to actively engage the class with the topic (20-30 min.). The presentations should cover what you learned from the foundational articles and additional readings. A presentation that actively involves participants is preferred and to this end diverse didactical approaches can be applied.
- It is advised to contact the lecturer of your groups' topic two weeks in advance to discuss how you intend to conduct the presentation(s) and interactive component, and/or assist you in designing the session – *this implies that you must have read the articles prior to this meeting*.
- It is strongly advised to contact the lecturer for your groups' topic by email for an appointment to ensure that you will have a consultation slot. Office hours of the lecturers are: Prof. Dr. Fischer: Thursday, 16.00 – 18.00; Prof. Dr. Strijbos, Tuesday, 14.00 – 16.00.

Assessment

- Participation in sessions is voluntary – except for the session during which your group presents.
- There will be an exam at the end of the semester with open questions and a couple of multiple choice questions covering the content of all five introductory courses.

Online learning environment

- The department uses the virtual learning platform „Moodle". To access Moodle, direct your browser to https://www.edupsy.moodle.elearning.lmu.de/login/index.php. Follow the direction on the right-hand-side menu („Anmeldung über die Campus-Kennung") and enter your login-in and password ("Campus Kennung") [NOTE. Log-in and password are case-sensitive]. When you enter Moodle, select „Wintersemester 2013/2014" and „Psychology Master's Program in the Learning Sciences". Next you can register yourself to the course „P1.2 Introduction to Learning, Instruction, Training and Technology". The password for self-registration is „facebook".
- If you do not have a "Campus Kennung" or experience problems during the self-registration (or any other problems with Moodle), please send an Email to iTeach-moodle@psy.lmu.de and provide the following information: name, Email-address, course you wish to access, etc.

Literature

23.10	**Three approaches to learning** *Foundational reading* Wilson, B. G., & Myers, K. M. (2000). Situated cognition in theoretical and practical context. In D. H. Jonassen & S. M. Land (Eds.), *Theoretical foundations of learning environments* (pp. 57-88). Mahwah, NJ: Lawrence Erlbaum Associates. *Further reading* Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher*, *27*, 4-13.
30.10	**Working memory and cognitive load** *Foundational reading* Sweller, J., Van Merriënboer, J. J. G., & Paas, G. W. C. (1998). Cognitive architecture and instructional design. *Educational Psychology Review*, *10*(3), 251-296. *Further reading* De Jong, T. (2010). Cognitive load theory, educational research, and instructional design: some food for thought. *Instructional Science*, *38*, 105-134. Kalyuga, S. (2011). Cognitive load theory: How many types of load does it really need? *Educational Psychology Review*, *23*, 1-19. Sweller, J. (2010). Element interactivity and intrinsic, extrinsic and germane cognitive load. *Educational Psychology Review*, *22*, 123-138.
06.11	**Skill acquisition and expert performance** *Foundational reading* Ericsson, K. A. (2006). The influence of experience and deliberate practice on the development of superior expert performance. In K. A. Ericsson, N. Charness, P. Feltovich, and R. R. Hoffman, R. R. (Eds.). *Cambridge handbook of expertise and expert performance* (pp. 685-706). Cambridge, UK: Cambridge University Press. *Further reading* Schank, R. C. (1999). *Dynamic memory revisited*. Cambridge, MA: Cambridge University Press. [Available in the psychology library under code: 1100/CP 5000 1999 SDM] Van Lehn, K. (1996). Cognitive skill acquisition. *Annual Review of Psychology*, *47*, 513-519.
13.11	**Situated cognition** *Foundational reading* Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *18*(1), 32-42. *Further reading* Cognition and Technology Group at Vanderbilt (1992). The Jasper Series as an example of anchored instruction: Theory, program description, and assessment data. *Educational Psychologist*, *27*(3), 291-315. Spiro, R. J., Collins, B. P., Thota, J. T., & Feltovich, P. J. (2003). Cognitive flexibility theory: Hypermedia for complex learning, adaptive technology, and experience acceleration. *Educational Technology*, *Sept-Oct*, 5-10.

20.11	**Distributed and shared cognition** *Foundational reading* Salomon, G. (1993). No distribution without individuals' cognition: A dynamic interactional view. In G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations* (pp. 111-138). Cambridge, MA: Cambridge University Press. *Further reading* Hutchins, E. (2001). Distributed cognition. In N. J. Smelser & P. B Baltes (Eds.), *International Encyclopedia of the Social and Behavioral Sciences* (pp. 2068-2072). Oxford, UK: Elsevier. Pea, R. (1993). Practices for distributed intelligence and designs for education. In G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations* (pp. 47-87). Cambridge, MA: Cambridge University Press.
27.11	**Worked examples and 4C/ID** *Foundational reading* Renkl, A. (2011). Instruction based on examples. In R. E. Mayer & P. A. Alexander (Eds.), *Handbook of research on learning and instruction* (pp. 272-295). New York: Taylor & Francis. *Further reading* Kirschner, P. A., & Van Merriënboer, J. J. G. (2008). Ten steps to complex learning: A new approach to instruction and instructional design. In T. L. Good (Ed.), *21st century education: A reference handbook* (pp. 244-253). Thousand Oaks, CA: Sage.
04.12	**Multimedia learning and multiple representations** *Foundational reading* Mayer, R. E. (2008). Applying the science of learning: Evidence-based principles for the design of multimedia instruction. *American Psychologist*, *Nov*, 760-769. *Further reading* Ainsworth, S. (2006). DeFT: A conceptual framework for considering learning with multiple representations. *Learning and Instruction*, *16*, 183-198. Schnotz, W., & Bannert, M. (2003). Construction and interference in learning from multiple representation. *Learning and Instruction*, *13*, 141-156.
11.12	**Scaffolding and tutoring** *Foundational reading* Quintana, C., Reiser, B. J., Davis, E. A., Krajcik, J., Fretz, E., Duncan, R. G., Kyza, E., Edelson, D., & Soloway, E. (2004). A scaffolding design framework for software to support science inquiry. *Journal of the Learning Sciences*, *13*(3), 337-386. *Further reading* Graesser, A. C., D'Mello, S., & Cade, W. (2011). Instruction based on tutoring. In R. E. Mayer & P. A. Alexander (Eds.), *Handbook of research on learning and instruction* (pp. 406-426). New York: Taylor & Francis. Aleven, V., Roll, I., McLaren, B., & Koedinger, K. R. (2010). Automated, unobtrusive, action-by-action assessment of self-regulation during learning with an intelligent tutoring system. *Educational Psychologist*, *45*(4), 224-233.

18.12	**Collaborative learning** *Foundational reading* Slavin, R. E. (1996). Research for the future: Research on cooperative learning and achievement: What we know, what we need to know. *Contemporary Educational Psychology*, *21*, 43-69. *Further reading* Stegmann, K., Wecker, C., Weinberger, A., & Fischer, F. (2012). Collaborative argumentation and cognitive elaboration in a computer-supported collaborative learning environment. *Instructional Science*, *40*, 297-323. Strijbos, J. W. (2011). Assessment of (computer-supported) collaborative learning. *IEEE Transaction on Learning Technologies*, *4*(1), 59-73. Weinberger, A., Stegmann, K, & Fischer, F. (2010). Learning to argue online: Scripted groups surpass individuals (unscripted groups do not). *Computers in Human Behavior*, *26*, 506-515.
08.01	**Problem-based learning and inquiry learning** *Foundational reading* Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist*, *41*(2), 75-86. White, B. Y., & Fredriksen, J. R. (1998). Inquiry, modeling, and metacognition: Making science accessible to all students. *Cognition and Instruction*, *16*, 3-118. *Further reading* Hmelo-Silver, C. E., Duncan, R. G., & Chinn, C. A. (2007). Scaffolding and achievement in problem-based and inquiry learning: A response to Kirschner, Sweller, and Clark (2006). *Educational Psychologist*, *42*(2), 99-107. Kuhn, D. (2007). Is direct instruction an answer to the right question? *Educational Psychologist*, *42*(2), 109-113. Schmidt, H. G., Loyens, S. M. M., Van Gog, T., & Paas, F. (2007). Problem-based learning is compatible with human cognitive architecture: Commentary on Kirschner, Sweller, and Clark (2006). *Educational Psychologist*, *42*(2), 91-97. Sweller, J., Kirschner, P. A., & Clark, R. E. (2007). Why minimally guided teaching techniques do not work: A reply to commentaries. *Educational Psychologist*, *42*(2), 115-121.
15.01	**Simulation-based learning** *Foundational reading* De Jong, T. (2011). Instruction based on computer simulations. In R. E. Mayer & P. A. Alexander (Eds.), *Handbook of research on learning and instruction* (pp. 446-466). New York: Taylor & Francis. *Further reading* Lui, M., & Slotta, J. D. (in press). *Immersive simulations for smart classrooms: Exploring evolutionary concepts in secondary science*. Stegmann, K., Pilz, F., Siebeck, M, & Fischer, F. (2012). Vicarious learning during simulations: Is it more effective than hands-on training. *Medical Education*, *46*, 1001-1008.

22.01	**Community-based learning** *Foundational reading* Scardamalia, M., & Bereiter, C. (2006). Knowledge building: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences* (pp. 97-118). New York: Cambridge University Press. *Further reading* Bielaczyc, K. & Collins, A. (1999). Learning communities in classrooms: A reconceptualization of educational practice. In C. M. Reigeluth (Ed.), *Instructional-design theories and models, Vol II* (pp. 269-292). Mahwah, NJ: Lawrence Erlbaum Associates. Eberle, J., Stegmann, K., Lund, K., Barrat, A., Sailer, M., & Fischer, F. (2013). Fostering learning and collaboration in a scientific community – evidence from an experiment using RFID devices to measure collaborative processes. In N. Rummel, M. Kapur, M. Nathan & S. Puntambekar (Eds.), *To see the world and a grain of sand: Learning across levels of space, time and scale: CSCL 2013 conference proceedings Vol. 1 – Full papers and symposia* (pp. 169-175). Chicago, IL: ISLS. Kirschner, P. A., & Karpinski, A.C. (2010). Facebook® and academic performance. *Computers in Human Behavior*, *26*, 1237-1245.