Why constructivists should not talk about constructivist learning environments: a commentary on Loyens and Gijbels (2008)

Alexander Renkl

In this journal, Loyens and Gijbels (2008) recently edited an interesting and inspiring special issue on the effects of constructivist learning environments. In this commentary, I do not want to evaluate the specific strengths and shortcomings of the single contributions or of the special issue as a whole. Rikers et al. (2008) have already provided such a balanced evaluation of the special issue's contributions. This commentary focuses on more fundamental issues. Actually, I want to claim that it is a paradox if constructivists talk about constructivist learning environments. I know that many readers will now think that my claim is a paradox. However, in the following I will show why my claim is not at all contradictory (see also Renkl 2008).

At this point, it is sensible to recapitulate what the core of constructivism is. Loyens and Gijbels (2008) have identified the following core assumptions:

> … the essence of constructivism is that students actively construct knowledge. In other words, the acquisition of knowledge is a process of knowledge construction (…). The core element of this assumption is that learners interpret new information using knowledge that they have already acquired. Learners activate prior knowledge and try to relate new information to knowledge they already possess. By doing so, understanding subject matter is a function of knowledge construction and transformation, not merely information acquisition and accumulation … (p. 352).

I fully agree with this characterization, at least with respect to meaningful learning: that is, learning that leads to conceptual understanding, transferable skills, and accelerated further learning. Some learning might *not* best be conceptualized as active sense-making and knowledge construction. Examples would be "biologically primed" learning processes (such as learning one's mother tongue; cf. Geary's (1995) concept of biologically primary abilities); processes of classical conditioning (e.g., when math word problems become associated with negative affective reactions), or strengthening processes in later stages of cognitive skill acquisition. However, with respect to *meaningful* learning—and the special issue focuses on this type of learning—the core of constructivism consists of the

A. Renkl (✉)

Institute of Psychology, University of Freiburg, Engelbergerstraße 41, 79085 Freiburg, Germany
e-mail: renkl@psychologie.uni-freiburg.de

epistemological assumptions (a) that learners actively interpret encountered data on the bases of their prior knowledge (sense-making process) and (b) that they actively construct knowledge on the bases of these interpreted data. In some contributions to the special issue (e.g., Loyens et al. 2008), additional assumptions such as "importance of authentic problems" were regarded as central. However, these assumptions do not belong to the *epistemological* core of constructivism.

In order to prevent misunderstandings: I personally also agree with the epistemological core assumptions of constructivism. I see myself as a constructivist. Why do I nevertheless think that we should not talk about constructivist learning environments?

A typical "constructivist" argument is that in traditional learning arrangements the students adopt a passive role and the instructional methods do not support active sense-making and knowledge construction. Therefore, we should rely on more learner-centered methods involving active collaboration, settings that require and thereby also foster self-regulation, and authentic learning contexts (see Loyens and Gijbels 2008). In such constructivist learning environments learners can engage in active sense-making and knowledge construction activities.

The argument in the preceding paragraph is only convincing at the very first glance: the epistemological claims about active sense-making and knowledge construction are claims on the descriptive level of analysis ("What *is* meaningful learning?"). It becomes problematic if one transfers these claims to the prescriptive level of analysis ("What *should* meaningful learning look like?") in an unreflecting way by saying that learning arrangements *should* be constructivist in order to induce active sense-making and knowledge construction on the learners' side and that they should not be "traditional" because these learning environments do not foster sense-making and knowledge construction. If—as epistemological constructivism claims on the descriptive level—meaningful learning always involves active sense-making and knowledge construction, there can be no passive or non-constructivist learning (environments). Otherwise traditional or non-constructivist learning environments such as lectures or environments with worked-out examples would be no learning environments at all. If you sensibly admit that learners can also understand something on a deeper level in a (good) lecture or in an example-based environment then you have to admit that "constructivist learning"—active sense-making and knowledge construction—occurs there too. In a lecture, the teacher produces sound waves that have to be interpreted by the students on the basis of their knowledge of the teacher's language (e.g., note that German or Dutch lectures would not make any sense for most people in the world speaking others languages), of the concepts and technical vocabulary of the domain (i.e., prior domain knowledge), and of knowledge from everyday experiences (e.g., when the teacher provides an example from an everyday context). The knowledge construction processes are, in turn, based on the information gained by the meaningful interpretation of the sound waves produced the teacher. In this sense, learning in lectures is a deeply constructive process.

Based on the preceding argument, we claim that it is paradoxical to differentiate between constructivist and other (i.e., non-constructivist) learning or learning environments if you adopt a constructivist epistemological stance. It is assumed that all learning is a constructive act. Hence, non-constructivist learning (in the sense of meaningful learning) cannot exist.

By the way, an analogical argumentation can be applied to pleas for situated learning environments (see Renkl 2001; cf. also the "learning in a context" claim by Loyens and Gijbels 2008, and the claims about situated learning by Baeten et al. 2008). From a situated cognition perspective—which claims that learning and cognition are always situated—

there cannot be any non-situated learning. What can be claimed is that learning is not situated in a favourable way (e.g., situated in a traditional school culture that is detached from "real-world" settings).

Although, the present analyses lead to the conclusion that talking about constructivist learning (environments) is, at best, a pleonasm, my criticism of this term is not purely a matter of terminology. I also claim that one cannot directly deduce from the basic constructivist assumptions of active sense-making and knowledge construction that so-called "constructivist" learning environments are superior to arrangements that are usually regarded as "traditional." What one can conclude is that in any type of (meaningful) learning environment, instruction should be designed in such a way that there is a high probability that students will engage in active sense-making and knowledge construction. Such an enhancement of knowledge construction can also be achieved in "traditional" learning environments. Two corresponding examples from my own research are self-explanation prompts that induce not only active, but also focussed processing (Renkl and Atkinson 2007) of worked-out examples (Stark et al. 2002) or reflective writing assignments (learning journals) that foster active processing of lecture contents (Berthold et al. 2007; see also the combined lecture and portfolio approach by Baeten et al. 2008). These examples show that it is compatible to adopt a constructivist epistemological stance and to simultaneously employ learning environments that are usually considered as "traditional" arrangements.

I do not want to argue that the types of "constructivist" learning environment analysed in the special issue by Loyens and Gijbels (2008) are not sensible or are less sensible than learning environments from the "traditional camp." However, I want to point out that it is not sufficient to refer to the basic epistemological assumptions of constructivism to plead for the type of learning environments that are often regarded as "constructivist." I suggest refined and careful analyses of the advantages and disadvantages of more open, "constructivist" learning environments, on the one hand, and more "traditional" alternatives, on the other hand, with respect to how successfully they induce active and focussed sense-making and knowledge construction processes (and maybe also other processes if additional outcomes are being considered; see Loyens and Gijbels 2008).

In sum, I plead for taking the epistemological assumptions of constructivism seriously. Against this background we should not talk about constructivist learning in contrast to traditional or passive (i.e., non-constructivist) learning. Meaningful learning in "traditional" learning environments is also a constructive act. In addition, epistemological constructivism is compatible with a wide range of different types of learning environments. In this sense, I fully agree with Loyens and Gijbels (2008) that extreme views inevitably highlight the shortcomings of both views, which sets in a pendulum movement between extremes. A constructivist stance should lead us to focus on how to best induce active sense-making and knowledge construction, irrespective whether the chosen learning environment is usually regarded as a "traditional" or a "constructivist" arrangement (cf. also the balanced position of Harris et al. 2008).

References

Baeten, M., Dochy, F., & Struyven, K. (2008). Students' approaches to learning and assessment preferences in a portfolio-based learning environment. *Instructional Science, 36*, 359–374. doi:10.1007/s11251-008-9060-y.

Berthold, K., Nückles, M., & Renkl, A. (2007). Do learning protocols support learning strategies and outcomes? The role of cognitive and metacognitive prompts. *Learning and Instruction, 17*, 564–577. doi:10.1016/j.learninstruc.2007.09.007.

Geary, D. C. (1995). Reflections of evolution and culture in children's cognition: Implications for mathematical development and instruction. *The American Psychologist, 50*, 24–37. doi:10.1037/0003-066X.50.1.24.

Harris, K. R., Santangelo, T., & Graham, S. (2008). Self-regulated strategy development in writing: Going beyond NLEs to a more balanced approach. *Instructional Science, 36*, 395–408. doi:10.1007/s11251-008-9062-9.

Loyens, S. M. M., & Gijbels, D. (2008). Understanding the effects of constructivist learning environments: Introducing a multi-directional approach. *Instructional Science, 36*, 351–357. doi:10.1007/s11251-008-9059-4.

Loyens, S. M. M., Rikers, R. M. K. P., & Schmidt, H. G. (2008). Relationships between students' conceptions of constructivist learning and their regulation and processing strategies. *Instructional Science, 36*, 445–462. doi:10.1007/s11251-008-9065-6.

Renkl, A. (2001). Situated learning, out of school and in the classroom. In P. B. Baltes & N. J. Smelser (Eds.), *International encyclopedia of the social & behavioral sciences* (Vol. 21, pp. 14133–14137). Amsterdam: Pergamon.

Renkl, A. (2008). Lehren und Lernen im Kontext der Schule [Teaching and learning in school contexts]. In A. Renkl (Ed.), *Lehrbuch Pädagogische Psychologie* (pp. 109–153). Bern: Huber.

Renkl, A., & Atkinson, R. K. (2007). Interactive learning environments: Contemporary issues and trends. An introduction to the special issue. *Educational Psychology Review, 19*, 235–238. doi:10.1007/s10648-007-9052-5.

Rikers, R. M. K. P., van Gog, T., & Paas, F. (2008). The effects of constructivist learning environments: A commentary. *Instructional Science, 36*, 463–467. doi:10.1007/s11251-008-9067-4.

Stark, R., Mandl, H., Gruber, H., & Renkl, A. (2002). Conditions and effects of example elaboration. *Learning and Instruction, 12*, 39–60. doi:10.1016/S0959-4752(01)00015-9.