To be, or not to be...

When and how 360-degree video enhances learning

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The use of video technology for learning purposes is as old as the medium itself...
The use of video technology for teaching and learning had been established in a variety of educational areas...
...because film and video offer a possibility to engage with a learning object within an authentic setting without the pressure to act.

https://gph.is/2nBWLRm
Therefore, with the use of video "it is likely that one's own knowledge is explicated and then expanded."

(Vohle & Reinmann, 2014, p. 3)
The "origin of learning processes are authentic problematic situations which due to their level of reality and relevance motivate learners to acquire new knowledge or new skills."

(Reinmann-Rothmeier & Mandl, 1996, p. 68f.).
Audio-visually documented action situations could be a good resource for learning, because on the one hand, they literally show a **problem** along with a possible **solution**, and on the other hand, the **problem is situated** by embedding it into the "real" context of action.
All in all, videos in teaching and learning contexts can fulfill **three functions**:

- as a **teaching medium** they support the communication of content,
- as a **learning tool** they support reflection and abstraction associated with video production,
- and finally, as a **motive for communication**, they enhance cognitive activities in handling the learning objects.
Taking all this under account, 360-degree video opens up new didactical options...
1. Adaption

...due to the **individual image section manipulation** and the corresponding possible field of view - based on one's very own knowledge and interests.
due to the **immersive potential** of this medium (especially in combination with the VR-devices/HMD‘s), which imposes the sense of **presence** - the feeling of physically „actually“ being there.
3. Communication

...due to the **free choice of the image section**, the **exchange** about what is seen **expands**.

(„Have you seen this?!“)
What is 360-degree video about?

We are talking about videos, which have a **fixed plot** and in which users can **look around** from a **given camera position**.
360-degree video is **not VR**.
But 360-degree video is not just a 360-degree video either...
360-degree video experience depends on the projection device.
360-degree video experience depends on the **type of vision** (monocular or stereoscopic).
360-degree video experience depends on the **integrated audio** (mono, stereo or spatial).

**Spatial sound** is often crucial for the "**real"** presence experience.
Why use 360-degree video for teaching and learning?
Benefits:

„Activating presence engages the user and has been associated with both an increased recall of the virtual experience and increased situation awareness of their virtual environment.“

(Rupp et al., 2016, S. 2108)
But...

...presence experience within the use of 360-degree video is not always necessary or wanted.
Benefits:

360-degree video **improves the contextualisation** of the environment and thus offers a **transfer aid** for learning content.

(Olmos-Raya et al. 2018, p. 2045)
But...

...the gain of 360-degree video could apparently be different for novices and experts:

**Expertise** on a topic or a domain is an **advantage** within **self-directed learning** in **unstructured environments**.

(Reinmann, 2009, p. 83; Makransky & Lilleholt, 2018)
Here, the advantage may turn into a **disadvantage**:

„If I don't (yet) have any domain specific knowledge, then I don't know where to look or rather what is relevant.“
**Benefits:**

High *immersion* of 360-degree video correlates with positive *learning motivation*, which influences the learning engagement of students, leading to the *increased learning performance*.

(Olmos-Raya et al. 2018, p. 2055)
But...

...it is unclear which role the **novelty stimulus** plays here.
Benefits:

There is increased awareness of learning situations in immersive contexts.

(Rupp et al., 2018, p. S. 2111-2112)
But...

...Learners seem more **attentive** in VR environments for **surrounding content**, than for learning content.

(Rupp et al., 2018, p. S. 2111-2112)
Benefits:

360-degree video depicts a complex space so that nothing gets lost within research contexts.
But...

... a manipulation on the later data material already exists merely in the decision, where to position the camera.

(Reutemann, 2017, p. 138f.)
Benefits:

Regarding the research, it is not just about the content. The way of exploration of the (learning) spaces within the 360-degree video is itself an artifact in the aim of inter-individual behavior and reception patterns.

(Hebbel-Seeger & Diesch, 2019)
Example: Head movement pattern in the reception of a 360-degree video commercial
The added value of 360-degree shots, compared to fix-frame video formats, (individual exploration by the free manipulation of the image section) is closely related to the restriction of the influence on the user’s experience.
In the context of 360-degree videos, the selection, margin and composition of the image section as instruments of **attention control** are largely eliminated, which in turn leads to **special requirements for "storytelling"**.

(Beer, 2016; Hebbel-Seeger, 2017; Hebbel-Seeger & Diesch, 2019)
360-degree videos can be edited like "classical" video formats: Sequencing of clips, manipulation of time (slow-motion, time-lapse), integration of artificial CG-content (captions, images)...

However, "classical" fix-frame videos can also be extracted from 360-degree videos ("reframing") with the advantage of being able to postpone the decision about the framing until the post production process.
360-degree video is not an alternative, but an extension of the potential of video in teaching, learning and research.
On the case of "sustainability", we are working on a joint research project* on the use of innovative video technologies (especially 360-degree video) in support of research-based learning within crowd processes.

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Video based learning through research on sustainability – Student Crowd Research

Using (various types of) video as a **product**, **tool** and **process**
As a **product**...

...videos have a **documentary function**, which can also be the basis for an assessment in academic context.
As a product...

...videos have a communicative function if, in the sense of “social video learning” (Vohle, 2016), the visualized content becomes the subject of discussion.

Within 360-degree video we’re talking about an “sightseeing effect”.
As a tool (in a narrower sense)...

...videos support cognitive activities in learning and research processes with different functions in different research stages:

- to explore an actual stage,
- to induce (self-) reflection
- to collect data,
- to analyze data, etc.
As a tool (in a broader sense)...

...the tool function of video is in the aim of organizing the learning and research process:

• to represent the previous process,
• to publish (demonstrate) the results,
• to communicate on the process itself, etc.
As an **epistemological tool** within a research process...

...videos have different functions in different research stages:

- Exploration of an actual stage,
- Collection of data,
- Analysis of data etc.
As a process ...

...videos have a **support function**, if the planned visualization make the students abstract and depict facts and circumstances.
Summary and Outlook

The use of 360-degree video is not primarily a question of being or not being (present), but rather another facet of condensing the medium "video" into a learning weave.
Thanks for your attention.

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References:


