

# The Lecturer-Topic-Students-Cube:

Good case scenarios for using virtual rooms as part of blended learning

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## Contents

1. E-learning .....	1
2. Blended learning .....	2
3. E-teaching in virtual rooms .....	4
4. Recordings and the pathway to blended learning.....	6
5. Success factors for teaching in virtual rooms .....	7
6. Combination of success factors.....	9
7. Conclusion.....	12
List of literature and sources.....	13
Copyright .....	13

Fig. 1: Advantages and disadvantages.....	1
Fig. 2: Blended-learning aspects .....	2
Fig. 3: Example of teaching in a virtual room.....	4
Fig. 4: Time and space-dependencies.....	5
Fig. 5: Pathway from virtual room to re-usable web based trainings .....	7
Fig. 6: Critical success factors for teaching in virtual rooms .....	8
Fig. 7: Meaning of small cube, ring, dot and their colours or shades.....	9
Fig. 8: Possibility-cube of lecturer-student-topic-constellations .....	9
Fig. 9: Pathway from lower bad case to upper best case .....	11
Fig. 10: Dark red backside of the possibility-cube with misfits.....	11



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# 1. E-learning

In order to define suitable scenarios for the use of virtual classrooms in an academic world, virtual rooms must first be located in the cosmos of e-learning and e-teaching.

Ask three experts about e-learning and you will get five opinions. But most of them will agree that e-learning is the use of electronic information and communication technologies in education. After surpassing a valley of disillusionment for pure e-learning activities it has been recognized nowadays, that advantages and disadvantages occur in different learning scenarios. As shown in Fig. 1 the time-independence of traditional e-learning is an advantage, because learners choose their own start-time, end-time and pace of studying. But there are disadvantages on the other hand: e.g. socializing isn't easy, if students are working alone in a Web Based Training. [1] On the other hand, presence learning with mostly face-to-face-situations is very useful for socialization but requires the participants to get together on a specific time.

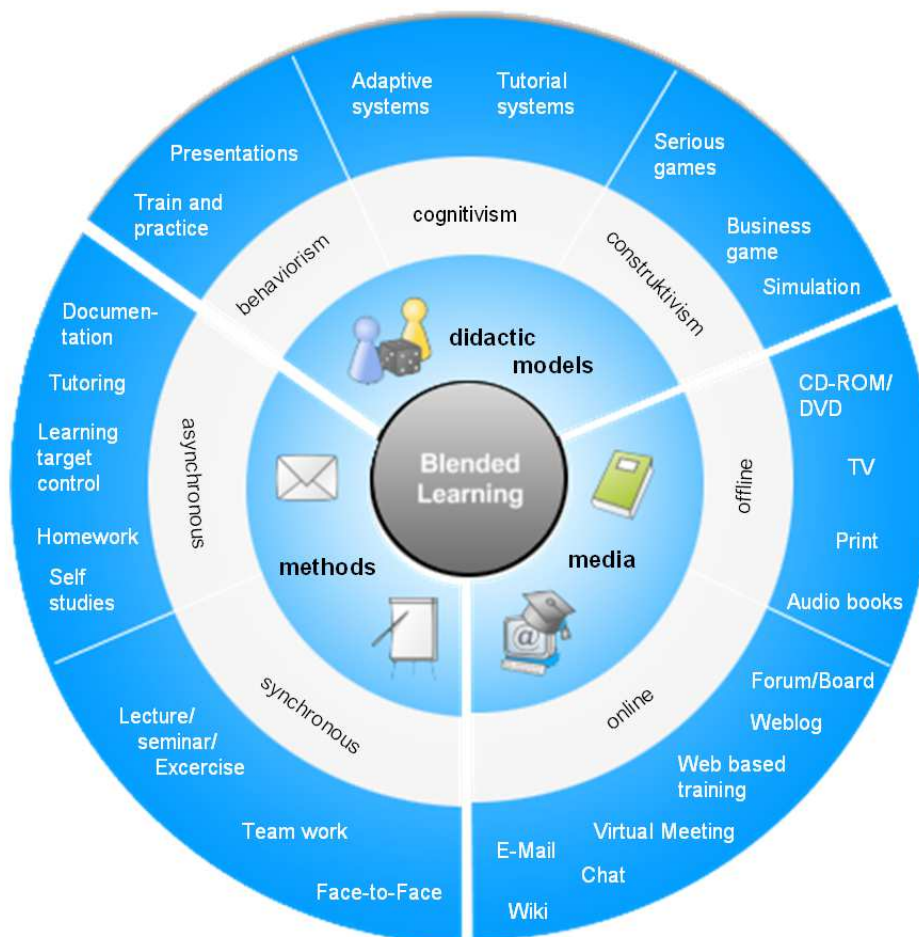
	<b>Presence Learning, real or virtual room</b>	<b>Traditional E-Learning</b>
Advantages	<ul style="list-style-type: none"> <li>+ participants socialize, form a group</li> <li>+ lecturer and participants meet in person</li> <li>+ holistic communication</li> </ul>	<ul style="list-style-type: none"> <li>+ participants study where and the way it suits them best</li> <li>+ participants determine their own pace of studying</li> <li>+ subject matter is well prepared</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- all people have to be in the same (real or virtual) place at the same time</li> <li>- participants have to study at the same pace (no fast forward)</li> <li>- participants have to study the same subject matter</li> </ul>	<ul style="list-style-type: none"> <li>- no/little socializing and connection to other participants</li> <li>- misinterpretations of contents remain unnoticed</li> <li>- high level of self-learning competence is required</li> </ul>

**Fig. 1: Advantages and disadvantages**

Source: [1]

## 2. Blended learning

The concept of blended learning tries to be a good mixture of the advantages of presence-learning and the advantages of traditional e-learning. It tries to combine the best of both worlds. It is a concept in which a student learns at least in part through electronic delivery of content and instruction with some element of student control over time, place, path or pace. “[...] While still attending a ‘brick-and-mortar’ school structure, face-to-face classroom methods are combined with electronic-mediated activities.”[2] The following illustration of aspects of Blended learning (B-learning) can be used for an analysis of current or planned b-learning projects and for identifying the position of virtual rooms.



**Fig. 2: Blended-learning aspects**

Source: [3, p. 69]

Therefore, by combining presence learning and e-learning, b-learning integrates various methods, media and didactic models in a beneficial way. Those can be classified as follows:

Regarding the methods, one can distinguish between those, where the teacher and the students have to be active at the same time (synchronous methods), e. g. lectures or group works and those, where they don't have to be active at the same time (asynchronous methods), e.g. home work or self studying.

Types of media, in regard to blended learning, are differentiated by their need for an internet connection in order to use them. Examples for online media are boards or forums or e-mail-lists. Examples for offline media are books, DVDs and magazines. Furthermore a differentiation in electronic and non-electronic media would be possible.

People love to learn, but they hate to be taught. – Therefore, didactic models try to explain how human learning works and how the learning- and teaching-process should be arranged by lecturers.[5] Depending on the preferred model, different methods of learning are favoured for good-quality learning outcomes:

- Behaviourism tries to facilitate knowledge by repetition and imitation. It is centred on the direct connection between a problem and its solution. Methods connected to behaviourism are train-and-practice or presentations.
- Constructivism builds on the premise that knowledge is gained through the confrontation with real-life situations. By developing solutions autonomously, existing knowledge should constantly be expanded. Methods connected to constructivism are business-games and simulations.
- Cognitivism considers most of all the process of solving problems an important source of learning. Thereby, a better comprehension for what has been learned should exceed the pure problem-solution-link. Here, e.g. tutorial systems are used, where teachers support students to find their own way of solution.

Because most of the learning scenarios depend initially on the teacher and the teacher seems to be a critical factor, it is useful to emphasize this by using the term e-teaching instead of e-learning.

### 3. E-teaching in virtual rooms

Virtual rooms are web-based places, which enable students and lecturers to meet synchronously/simultaneously in a media-integrated and interactive way. Typical kinds of meetings in a virtual classroom are a lecture, a seminar with discussion, a tutorial lesson or a consultation hour.[6] Fig. 3 shows an example of a lecture with a typical pod-layout and additional descriptive text.

The screenshot shows a virtual meeting interface with several components:

- VIDEO-area:** A top section displaying four video feeds of participants in a pod layout.
- Chat:** A central chat window with messages from participants like Bastian Pott and Larissa Vette.
- Presentation:** A slide titled "Elemente eines Petri-Netzes" from the Fachhochschule des Mittelstands (FHM). It includes a table of symbols and their meanings.
- Annotations:** Green boxes with text are overlaid on the interface:
  - "List of real names of the participants" points to the participant list.
  - "Chat, for written questions" points to the chat window.
  - "Slides (Powerpoint), shown by the teacher" and "Alternative: An application or a screen of the teacher or of the student is broadcasted" point to the presentation slide.

Symbol	Benennung	Bedeutung
○	Stelle (Platz)	Zwischenablage für Informationen
□	Transition (Hürde)	Verarbeitung von Daten

Fig. 3: Example of teaching in a virtual room

Therefore, lectures in virtual rooms acc. to Fig. 1 can rather be assigned to face-to-face-learning than to traditional e-learning. It is presence learning in a virtual room. Although the rooms are virtual, the learning process and learning outcomes are real.

Acc. to Fig. 2 the teaching in virtual rooms is part of the online-electronic media and the synchronous methods, whereas the choice of the didactical model is open or subject-didactic depends on the topic.

Up to now, no figure shows if lectures in virtual rooms always have the advantage of being independent of place. Maybe surprisingly, Fig. 4 shows that this is not necessarily the case.

- First, as expected, in quadrant 2, using low-resolution (LR) and thin-client-technology like Adobe Connect, results in place-independence, so that the teacher can choose his teaching work area and students can choose their learning work area independent of their physical place.
- Second, in quadrant 4, no real place-independency is given, e.g. because a lecture-transmission is intentionally not broadcasted but done from one lecture hall with several people to another lecture hall. In this case a high-resolution (HR) and best-quality-video-audio-conference can be used, like it is possible with special equipments, e.g. Tandberg-systems.
- Quadrant 1 shows the traditional e-learning with web-based-training-programmes, which are developed with authorware tools and distributed by using learning-management-systems like Moodle or holistic campus-management-systems like TraiNex.
- Finally, quadrant 3 shows the unusual case that the learning is done asynchronously but dependent of place, e.g. self-instructional-programmes with campus-licence or campus-based-hardware.

	time-independent/ asynchronous	time-dependent synchronous
space-independent	<ul style="list-style-type: none"> <li>- Work in ComputerBasedTraining</li> <li>- work in WebBasedTraining</li> <li>- LR-Video-on-demand</li> <li>- read/write forum/mail</li> <li>- take MC-tests</li> </ul>	<ul style="list-style-type: none"> <li>- take part in chats</li> <li>- Webinar/LR-Web-Conference</li> </ul>
space-dependent or dependent of hardware	<ul style="list-style-type: none"> <li>- HR-Video-on-demand</li> </ul>	<ul style="list-style-type: none"> <li>- HR-Video-broadcast</li> <li>- HR-Web-conferencing</li> <li>- App sharing</li> </ul>

**Fig. 4: Time and space-dependencies**

Source: [1]

## 4. Recordings and the pathway to blended learning

Recordings, not of a whole lecture, but of parts of a lecture, can be a linking part in an e-learning concept. If recordings of a lecture/a webinar (quadrant 2 of Fig. 4), are taken, a lecturer can use the recordings to build up a library of audio-video-presentations, e.g. recordings that show the procedure of complicated calculations or important slide explanations or even a talk about basic slides. The recordings can then be used as a simple video-on-demand, online or offline, in an asynchronous way (quadrant 1).

This gives the lecturer new didactic possibilities: the recordings are not mainly a service for reworking purposes. They can also be given to other students, who can rework a calculation, that was only mentioned but not explained, or to intensify a special focus after a lecture. Or before a lecture, it can be used as preparation or to learn the basic theory of a topic asynchronously (Behaviourism). During the later synchronous meeting in the virtual room, the participants can discuss or practice the learned topics instead of listening to basics (Cognitivism).

Recordings are also a possible and approved linking pathway from traditional presence teaching to presence teaching in the virtual room – and then to traditional e-learning. If asynchronous web based trainings are an aim of the university, because they are re-usable and massively scalable, it has to be considered, that the change of didactics and methods, which are needed to produce or moderate an asynchronous WBT, is a very big hurdle for a lecturer. Therefore it seems not to be a good idea to start with producing or moderating WBTs.

In contrast, the change of the didactic of a lecturer, who is experienced in traditional presence teaching and starts teaching in a virtual room, is small as illustrated in Fig. 5. A recording is produced “quick and dirty” by the lecturer himself, just by following this steps during a real lecture: “press start record button”, teach, “stop record” and “add to recordings pool”. The special part of the lecture, which is recorded, can then be used by the lecturer as a re-usable part in his ever day work by assigning it target oriented to specific groups of students. Or a pool of recordings can be used by the university in a blended learning concept. The pathway, indicated by the arrow in Fig.

5, can be rated as one with good opportunities and small risks for the university and as one with a good stimulus-contribution-ratio for the lecturer.

	Re-usability	Scalability	Change of lecturers method/didactic	Quad.
Web based training (WBT)	very high	very high	-	1
moderated WBT	high	medium	high	1
Lecture broadcast/seminar in virtual classroom	low	no	low	2 or 4

Fig. 5: Pathway from virtual room to re-usable web based trainings

Source: [1]

## 5. Success factors for teaching in virtual rooms

In summary, an assumption of the key success factors for good-quality teaching in virtual classrooms is given.[4]

- Available technology like hardware, software and bandwidth are a core restriction acc. to Fig. 6.
- Also a necessary but not sufficient condition is the organisational integration. The organisational integration of lecture broadcast into the academic processes of planning, communicating and giving access legitimation are essential.
- Cultural acceptance and acknowledgement on the academic and maybe even societal side is beneficial.

But especially important are the 3 combinational factors lecturer-student-topic, which are wrapped around the core restrictions.

Lecturers who are more or less suitable for tuition in virtual rooms should or will communicate a more or less suitable topic with an adjusted didactic model to more or less suitable students. Some lecturers will achieve good learning outcomes under some conditions, other lecturers achieve only bad learning outcomes under nearly the same conditions. Fig. 6 shows in the outer ring some of the beneficial aspects.



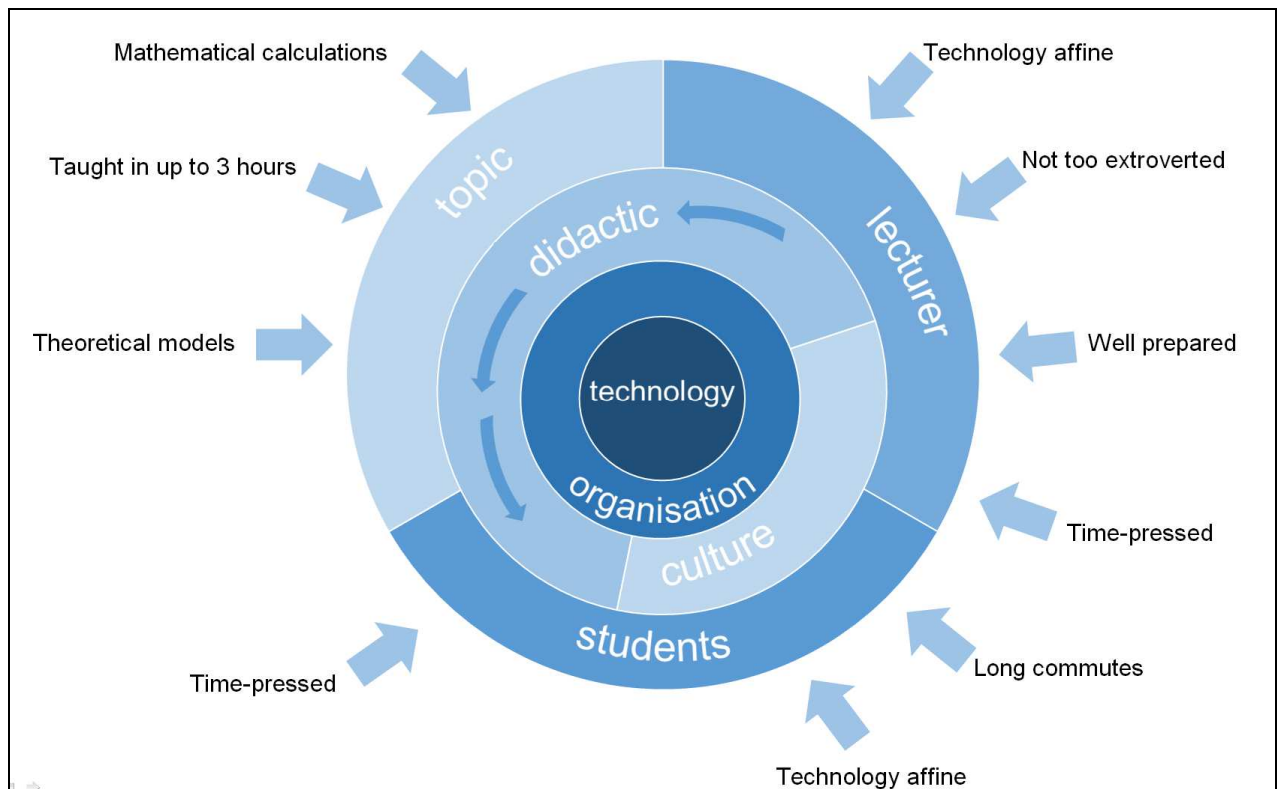


Fig. 6: Critical success factors for teaching in virtual rooms  
(source: self-created)

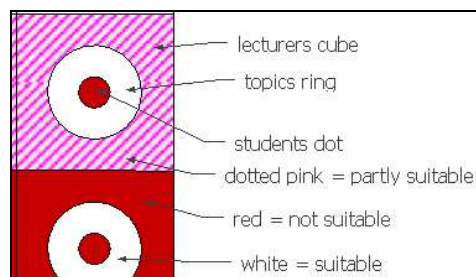
The worst-case imaginable is a mis-fit of lecturer-topic-student. If, e.g., a technophob-extroverted lecturer is forced to teach in a virtual room students, who are inhouse anyway, in a topic which is a haptic one like “stable side position in emergency care” which better can be demonstrated practically.

The best-case imaginable is a fit of lecturer-topic-student. A technophile and motivated lecturer who teaches part-time-students, who otherwise would have a long commute to be taught in a topic like “Strategies of marketing and advertising”.

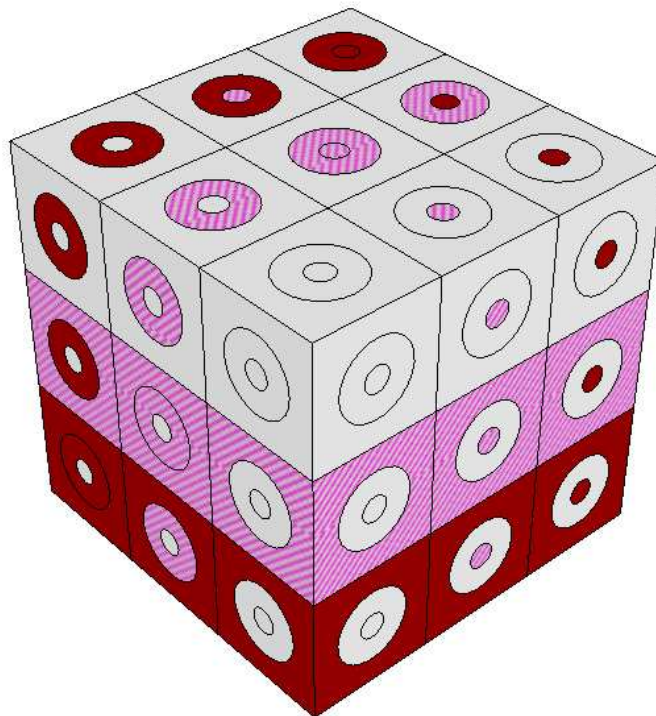
In every curriculum topics can in advance be identified as suitable or unsuitable for the virtual room. Moreover it is possible to identify, which student group is more suited than others. The most difficult part is to assess the suitability of the lecturers and this is why current researchers focus on the lecturer as the most critical factor.[7]

## 6. Combination of success factors

Because identical topics are taught by different lecturers in different student groups, every topic-lecturer-students constellation should be assessed separately. First of all this is a combinatorial task with 3 factors. Acc. to Fig. 8 there are 27 constellations of lecturer-students-topic, if besides a very suitable (white) and an unsuitable (red) also a partly suitable (dotted pink) evaluation is used. In each of the 27 small unique cubes the cube colour shade determines the lecturers suitability, the ring colour shade determines the topics suitability and the dot colour shade determines the students suitability as shown in Fig. 7.



**Fig. 7: Meaning of small cube, ring, dot and their colours or shades**  
(source: self-created)



**Fig. 8: Possibility-cube of lecturer-student-topic-constellations**  
(source: self-created)

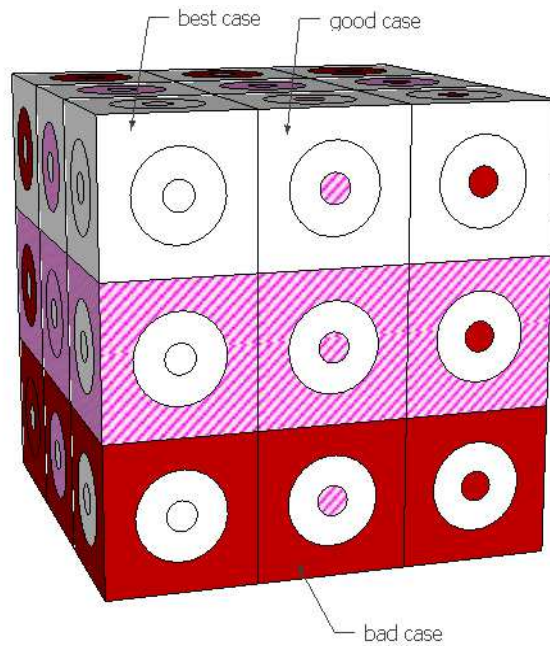
Unfolding the big dice results in an overall white best-case, shown in Fig. 8, in the middle. The lecturers small cube is white, the topics ring is white and the students dot

is white. On top of this extreme best case a lot of mixed good-cases and some bad-cases are visible.

Each constellation should cross a critical advantageousness to be considered suitable. In order to support decisions about the usage of virtual rooms, the 'good case' has to be defined more specific, e.g. like this: A good-case is defined in this way, that no cube, no dot and no ring should be red/unsuitable. The positive result of using this rule are 6 good cases and 1 best case after all. In other words, if all cubes are loaded with the same empirical likelihood, then approx. 25 per cent of all constellations in the academic world are suitable for the virtual room.

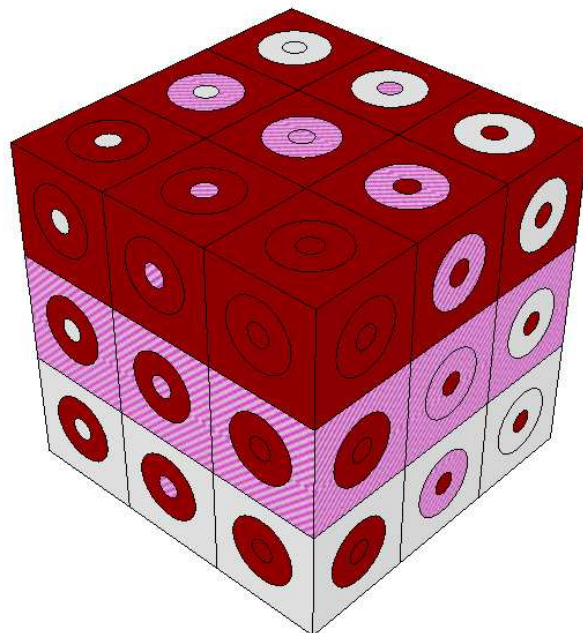
If good-case is defined differently so that one of the 3 factors lecturer/students/topic is allowed to be red/unsuitable, the number of good cases increases to 19 and 1 best case. Only 7 bad cases remain after all. In other words, only approx. 25 per cent of all cubes represent a not suitable situation for virtual classrooms. Most of them are located on the dark side of the dice and have not been "shown up" yet.

Maybe it is also possible to get an indication for improvements out of the dice. Assuming that you are located in the small bad case cube shown in Fig. 9 at the bottom, which is defined as a combination of partly fitting students, a very suitable topic but no suitable teacher – an improvement is possible. The best case cube can be reached by motivating or training the teacher and in addition by generating a more beneficial situation for the students.



**Fig. 9: Pathway from lower bad case to upper best case**  
 (source: self-created)

Whereas most of the good cases are seen on the front of the dice, the back of the dice shows a huge amount of bad case cubes. If you turn the big dice around, the overall red worst-case-scenario appears, as it can be seen in the top front on Fig. 10.



**Fig. 10: Dark red backside of the possibility-cube with misfits**  
 (source: self-created)

## 7. Conclusion

Virtual rooms can be one of the most important pieces in the puzzle of blended learning. If the necessary conditions regarding culture, technology and organisation are fulfilled, the realization of the opportunities depends on identifying suitable topics and creating beneficial situations for students and lecturers.

Lecturers with their different e-teaching-capabilities and -willingness are an important critical factor. But if first hurdles are taken and lecturers experience the possibilities by using the virtual room firsthand, real benefits will mostly be recognized by the lecturer. This includes, that recordings of parts of lectures enable the lecturer to use new didactics and methods like flipped classrooms. And finally the university can use the recordings to build up a pool of web based training videos, maybe for use in moderated – massive open or small private – online courses (mooc/spoc).

When discussing the pros and cons of teaching in virtual rooms, the cube-illustration may be helpful, because depending on how you rotate the cube, rather the good white or the bad red side of the cube is visible. If, in a discussion about virtual rooms, one wants to be part of the solution and not to be part of the problem, it's advisory to know the dark side of the cube and to direct the attention also to the white side and thus the potential of virtual rooms and blended learning.

It is not a matter of luck wether using the virtual room will be successful or not. It is not like simply "rolling a dice" and hoping for a big number. Using the dice of lecturer-student-topic-fit makes it possible to identify good cases and bad cases, to promote beneficial factors and to reach an optimal starting position for teaching in a virtual room as part of a blended learning concept.

## List of literature and sources

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