

# Enabling Stakeholders to Change: Development of a Change Management Guideline for Flipped Classroom Implementations

Linda Blömer, Alena Droit and Uwe Hoppe

*\*Institute of Information Management and Information Systems Engineering, Osnabrueck University,  
Katharinenstr. 3, Osnabrueck, Germany*

**Keywords:** Blended Learning, Flipped Classroom, Change Management, Stakeholder, Guideline.

**Abstract:** The successful introduction of the popular blended learning method Flipped Classroom (FC) is a major challenge because many stakeholders are affected. However, the transformation is dependent on the commitment of engaged individuals, who rarely have access to institutionalized support. Repeatable descriptions of strategic approaches and recommendations for how to manage a successful change in Higher Education Institutions are rare. This paper aims to synthesize research findings concerning Change Management (CM) approaches in a flipped learning context. Based on a systematic literature review, we develop a Guideline with specific recommendations for successful CM to develop and implement FC courses.

## 1 INTRODUCTION

Since the beginning of 2000 Blended Learning (BL) has emerged as one of the most popular e-learning concepts (Güzer & Caner, 2014). BL can be best described as “a blending of campus and online educational experiences for the express purpose of enhancing the quality of the learning experience” (Garrison & Vaughan, 2013). There are several BL methods that Higher Education Institutions (HEI) can use in their curricula, the most popular of which is currently the Flipped Classroom (FC) (Said & Zainal, 2017). In an FC, mere knowledge transfer takes place outside the classroom, e.g. by using videos, podcasts, and reading assignments (Said & Zainal, 2017). The in-class time of an FC can be arranged differently according to the needs; the main focus is on the application of the knowledge imparted online, problem-oriented and collaborative learning as well as discussions between students and teachers (McLean, Attardi, Faden, & Goldszmidt, 2016).

Transforming traditional lectures into FCs can be very complex and time-consuming, not only due to the fact that new contents and materials have to be produced and provided, but more importantly because throughout the whole process of development and implementation, different stakeholder groups have to be considered. Though some guidelines and models

for the systematic development of FCs exist, they primarily concentrate on content creation (Lee, Lim, & Kim, 2017), technical solutions (Herzfeldt, Kristekova, Schermann, & Kremer, 2011), and student experience (Chiang & Chen, 2017). New teaching methods need a careful introduction (Triantafyllou & Timcenko, 2015), and specific project requirements such as Change Management (CM) have to be taken into account (Herzfeldt et al., 2011). Research shows that more than fifty percent of organizational changes fail, mainly due to the resistance of affected stakeholders, rather than difficulties concerning technology or organizational structures (Bondarev, 2018). Stakeholders can develop a resistance to change either because they lack the knowledge and extent of the change, are uncertain about the results, fear the unknown, are afraid of innovation or because they think that they lack certain competencies (Bondarev, 2018). Flavell has discovered in an extensive literature research, that especially academic staff has issues to embrace new technologies (Flavell, Harris, Price, Logan, & Peterson, 2018), which are essential to creating FC courses. More specifically the low perceived value and relevance of technology (Debusse, Lawley, & Shibl, 2008), the fear of potential failure (Howard, 2013), lacking confidence (Dusick & Yildirim, 2000) and a lack of resources and support for new technologies (Adams Becker, Cummins, Davis, Hall

\* <https://www.wiwi.uni-osnabrueck.de>

Giesinger, & Ananthanarayanan, 2017) are reported issues. Students, administration and other HEI staff show signs of resistance to change during the FC development as well (Bishop & Verleger, 2013). Implementing an effective CM at universities is, therefore, necessary, but very challenging since HEIs are organizations that mainly consist of experts who are working quite independently in research and teaching (Morisse, 2016).

Although several studies have identified the relevance of CM in HEIs (Bondarev, 2018), the establishment of CM strategies and its integration into e-learning concepts, especially the FC, is rare (Flavell et al., 2018). Due to the defined lack of applicable models and approaches that include stakeholders and their motivation, this paper aims to present a Flipped Classroom Change Management Guideline (FC<sup>CM</sup> Guideline). Doing so, we will answer the following three research questions: (1) What current research can be found regarding the change from traditional lectures to FC courses? (2) Which specific change management tasks regarding the transition from traditional classes to FC courses exist in this literature? (3) How can the specific tasks be assigned to stakeholder groups and summarized as recommendations for action within the framework of a Guideline? To answer these questions, we conduct an intensive literature research. We describe our literature search in chapter 2 and give an overview of the findings in chapter 3. We then identify specific tasks and recommendations for action and summarize them in our FC<sup>CM</sup> Guideline in chapter 4.

## 2 METHOD

Search and Assessment	Synthesis and Interpretation	Guidance	Conclusion
Execution of a Literature Review	Findings <b>Research Question 1</b>	Holistic FC <sup>CM</sup> Guideline <b>Research Questions 2 &amp; 3</b>	Discussion, Limitations and Future Research
<b>Chapter 2</b>	<b>Chapter 3</b>	<b>Chapter 4</b>	<b>Chapter 5</b>

Figure 1: Research Process.

To build the FC<sup>CM</sup> Guideline on a solid foundation, we conduct a systematic literature review (Webster & Watson, 2002) considering the research phases search and assessment, synthesis and interpretation, guidance as well as a conclusion (Schryen, 2015). Figure 1 illustrates an overview of the research process by relating the respective phases of the literature review to the main focus of each chapter and the corresponding research questions.

The aim of our search is to obtain an overview of current research concerning CM in an FC context with a focus on existing CM tasks. Figure 2 shows the procedure of the systematic literature review in detail.

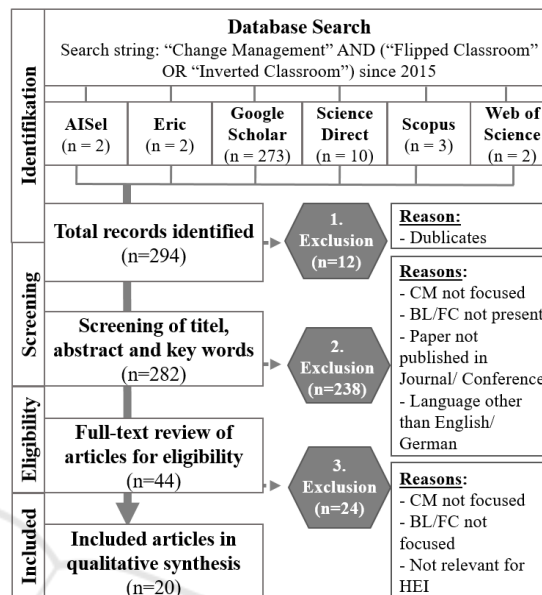


Figure 2: Systematic Literature Review.

We used a fixed search string shown in figure 2 in recommended databases for IS research (Schryen, 2015): AISel, Google Scholar, Science Direct, Scopus, and Web of Science. We also used ERIC (Education Resources Information Center) as a sixth database to include a more educational point of view. We only include articles published since 2015 to focus on current research. We then review the results in two steps and select them according to specific criteria (Figure 2). After the first exclusion of duplicates, we use predefined criteria to review the title and abstracts of the remaining papers (n=282). The underlying criteria relate to relevance, quality, and feasibility. In order to evaluate the relevance of the source in terms of content, a reference to CM and FC, or at least to BL, should be recognizable in the abstract. For example, articles often deal with the implementation of an FC in which CM is a topic of the affected course - however, the change process to FC that is of interest here is not addressed. In order to ensure the quality of the data, only published articles and conference papers are considered. For the sake of feasibility, sources that are not written in English or German are also excluded. The remaining articles and papers (n=44) are checked for their eligibility in a subsequent full-text review. As before, the underlying criteria is used to check the articles and papers. In addition, articles that are not considered relevant for

the HEI context (e.g. articles referring to K1-12) are excluded at this point since the present study deals with the change to FC in HEI.

### 3 FINDINGS IN SYSTEMATIC LITERATURE REVIEW

Our systematic literature research resulted in 20 articles. Surprisingly, in most articles we found, there was no usage or mention of any strategic CM approaches for transforming traditional classes to FC, even though that is often recommended (Bondarev, 2018). However, most articles mention the importance of CM and describe different CM actions, that were executed at their own HEI or observed in case studies.

Concerning the year of publication, it is striking that most papers were published within the last two years (n=15), showing the topicality of the papers. The 20 articles, which serve as a further basis, originate from 12 different countries, including Germany, Sweden, Australia, Chile, Pakistan and the US. It is surprising that only one article has its origins in the US because generally most studies on FC originate from there (Harris, Harris, Reed, & Zelihic, 2016) – however, the usage and research of CM approaches do not seem to have been increasingly addressed so far. The sources also vary in study design, e.g. project reports, case studies, literature analysis, as well as qualitative and quantitative surveys. There is a clear tendency towards case studies (n=7) and project reports (n=6), showing that the dominating part of research available is case-based. This can lead to a “siloeed” character of the research field, lacking systematic approaches. Since our guideline is based on these very different sources, we hope develop a guideline for practitioners and researchers that is applicable to different countries and for different approaches.

### 4 DEVELOPMENT OF THE GUIDELINE

After identifying the relevant articles (n=20), we collected and interpreted the CM tasks that can be found in the papers. In this step, two researchers, who are both experienced in implementing FCs, independently read the articles in regard to specific CM tasks and then synthesized their results. A total number of 132 tasks was identified and bundled on the basis of similar content into 58 specific tasks. We

summarized the tasks into 34 more general recommendations for action, which in turn are classified into ten upper categories, more precisely described in the following chapter.

#### 4.1 Overview of the Guideline

The ten derived categories are motivation, leadership, creation of a team, communication, culture and climate, goals and vision, removal of barriers, collaboration, infrastructure and technology, and feedback and adjustments. There is no universally valid order of the categories, but figure 3 shows one possible way to organize them.

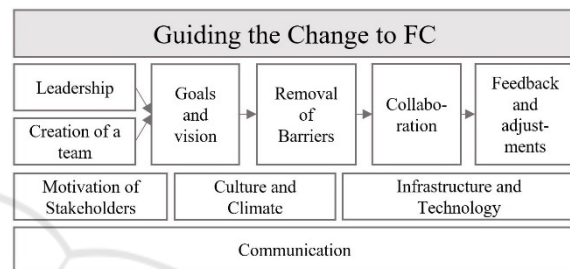


Figure 3: FC<sup>CM</sup> Guideline Overview.

Regardless of which stakeholder is driving the FC idea forward, the core process of the FC<sup>CM</sup> Guideline starts with the HEI management, that should support the idea and adapt its leadership accordingly, as well as with the creation of an FC development team. They then create goals and a vision for the transformation. Barriers of stakeholder groups have to be removed, and collaboration, inside and outside of the HEI should be encouraged. The FC development team should periodically collect feedback and adapt the development and implementation correspondingly. There are several categories that cannot be put into a specific order since they support multiple tasks of the core process. At all times, but especially in the beginning, it is important to motivate stakeholders and create incentives for them to participate. The culture and climate within the HEI should support innovative thinking and create an atmosphere of trust. The infrastructure and technology have to be planned by the project team and provided to students and teachers to enable a successful implementation. Throughout the whole CM process, communication within and between the stakeholder groups is the key for a successful change to FC. The corresponding recommendations for action and specific tasks are explained in chapter 4.2.

## 4.2 Recommendations and Specific Tasks

In the following chapter, we present the recommendations and specific tasks for each of the ten categories, in the order of the categories shown in figure 3. For each category, we first present a table (see table 1-10) and then provide additional information, like concrete examples from case studies. Each table shows the name of the recommendation, multiple related specific tasks, the stakeholder groups, who are mainly responsible for the tasks, and a reference to the articles.

Table 1: Leadership.

No.	Specific CM tasks	Stakeholder	References
1. Leadership style	Give the project team and teachers enough autonomy, have faith in teachers, use a mixture of top-down and bottom-up policies	H, PM	(Adekola, Dale, & Gardiner, 2017; Charbonneau-Gowdy & Chavez, 2018; Liebscher et al., 2015; Van Twembeke & Goeman, 2018)
	Embrace success and mistakes, collect feedback, learn from it and communicate it	H, F, PM	(Adekola et al., 2017; Charbonneau-Gowdy & Chavez, 2018)
	Acknowledge teachers' fears and do not tell them their ways are outdated	H, PM, PT	(Collyer & Campbell, 2015; Van Twembeke & Goeman, 2018)
	Communicate clearly that excellent education is one of the HEIs major goals, not only research	H, F	(White et al., 2016)
2. Conditions	Provide infrastructure, training, funding, support	H, PM	(Adekola et al., 2017; Collyer & Campbell, 2015)
	Ensure that there are explicit guidelines and policies for e-learning to reassure teachers and give orientation	H, F, PM	(Adekola et al., 2017)

(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students

**Leadership:** The HEI management and project team should ensure proper working conditions for the FC transformation, like the supply of infrastructure, training, funds, and guidelines (Adekola et al., 2017). Explicit guidelines and policies for e-learning provide teachers with ethics and legal orientation (Adekola et al., 2017; Iqbal, Ahmad, & Willis, 2017). One of the drivers for change can be nationwide governmental policies for the implementation of technology-enhanced learning (Iqbal et al., 2017). The effectiveness of leadership is highly dependent on the leadership style. Research recommends that leaders have to carefully communicate with stakeholders, for example, not telling teachers that the way they have

taught for the last 20 years was wrong, and they have to do everything differently now. Instead appreciate what they have done before, explain to them that the usage of new technologies can help to make their courses even better and show the benefits (Collyer & Campbell, 2015; Van Twembeke & Goeman, 2018). Some authors state, that neither only a bottom-up nor a top-down approach work for most HEIs, but instead the combination of both (Charbonneau-Gowdy & Chavez, 2018; Liebscher et al., 2015; Van Twembeke & Goeman, 2018). Great support of the senior management for the FC project as well as single motivated teachers (Van Twembeke & Goeman, 2018) are major factor for the success of the project (Adekola et al., 2017). The HEI management should have faith in teachers and grant them a certain autonomy (Adekola et al., 2017) because otherwise teachers might feel forced, disempowered and settle for less (Charbonneau-Gowdy & Chavez, 2018). Duisburg-Essen University's management deliberately chose the way via faculty committees to involve all status groups at an early stage in the sense of promoting ownership (Liebscher et al., 2015).

Table 2: Creation of a team.

No.	Specific CM tasks	Stakeholder	Ref.
3. Members	Involve teachers, students, faculty, development leaders, curriculum designers, technology support, management	H, PM	(Hurtubise, Hall, Sheridan, & Han, 2015; Hutchings & Quinney, 2015; Nordquist, Sundberg, & Laing, 2016; Van Twembeke & Goeman, 2018)
	Choose resilient and experienced team members for success	H, PM	(Charbonneau-Gowdy & Chavez, 2018; Owen & Dunham, 2015)
4. Roles and tasks	Declare change agents who set routine meetings & manage team climate, collecting feedback	PM	(Hurtubise et al., 2015; Nordquist et al., 2016; Van Twembeke & Goeman, 2018)
	Establish leadership; form a guiding coalition	H, PM	(Hurtubise et al., 2015)
	Develop curricular goals, define new ways of assessments, select technology tools	PM, PT, T, C	(Hurtubise et al., 2015)
5. Working approach	Use for example an iterative agile approach to implement FCs	PM, PT	(Owen & Dunham, 2015)
6. Team spirit	Establish trust and open communication within the team	PM, PT	(Hutchings & Quinney, 2015; Nordquist et al., 2016)

(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students

**Creation of a Team:** The FC project team should be a multidisciplinary task force (Nordquist et al., 2016)

with experienced members and clearly defined leadership by a project manager (Charbonneau-Gowdy & Chavez, 2018), who also acts as a role model (Daniel, Hüther, & Ohngemach, 2018). Team members draw on the enthusiasm, experience, and commitment of each other to deal with challenges and constraints (Hutchings & Quinney, 2015) and it is therefore very important to meet periodically (Van Twembeke & Goeman, 2018) and to establish trust within the team (Owen & Dunham, 2015). If the project team chooses an iterative agile approach for the implementation of FCs, it has to remember that besides the advantages explained in detail by Schoop et al., existing institutional systems and structures at university might not be compatible with agile approaches (Owen & Dunham, 2015).

Table 3: Goals and vision.

No.	Specific CM tasks	Stakeholder	Ref.
7. E-learning strategy	Address different fields in your strategy: didactics, technology, organization, economy, culture	H, PM, PT	(Schoop, E., Köhler, T., Börner, C., Schulz, J., 2016)
	Define e-learning goals, set interim targets	H, PM, PT	(Liebscher et al., 2015; White et al., 2016)
	Define quality criteria and measures, integrated into the university's quality management system and test these throughout the project	PM, PT	(Daniel et al., 2018; Hurtubise et al., 2015; Schoop et al., 2016)
8. Vision	Build a task force of stakeholders, including faculty, students, administration, facility management, educate all members of the task force, and create a shared vision	H, PM, PT	(Nordquist et al., 2016; White et al., 2016)
	Communicate the vision by sharing the intent and value of FC with students and other stakeholders	H, PM, PT, T	(Hurtubise et al., 2015)
	<i>(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students</i>		

**Goals and Vision:** HEIs should not engage in e-learning just to use new technologies; e-learning is a tool and not a solution (Liebscher et al., 2015). That is why it is so important to define an e-learning strategy that includes specific goals (White et al., 2016) and interim targets (Van Twembeke & Goeman, 2018), with defined quality criteria and measures (Schoop et al., 2016). Some universities might have to develop new methods of teaching evaluations (Daniel et al., 2018) to measure those criteria. It is important to evaluate throughout the different project stages and beyond to compare results, e.g., in order to see if student satisfaction or

learning outcomes have improved (Hurtubise et al., 2015). A task force should be founded to develop a vision for the institution and communicate it (Nordquist et al., 2016; White et al., 2016).

Table 4: Removal of barriers.

No.	Specific CM tasks	Stakeholder	Ref.
9. Time and effort	Start small, instead of reconstructing the whole syllabus right away begin with partly transforming units into FC	PT, T	(Harris et al., 2016)
	Release involved teachers from parts of their duties during the implementation of an FC	H, F	(Berglund et al., 2017; Owen & Dunham, 2015)
10. Financial resources	Minimize impact on staff time by supplying e-tutors or additional teaching assistants	H, F	(Van Twembeke & Goeman, 2018; White et al., 2016)
	Provide money for new infrastructure and technology, ensure sustainable funding	H, F	(Liebscher et al., 2015; Schoop et al., 2016)
11. Teacher training	Offer in-depth training for media competence, technology usage, LMS, copyright issues. Provide easily understandable materials in the local language	PM, PT, IT	(Berglund et al., 2017; Hurtubise et al., 2015; Liebscher et al., 2015; Van Twembeke & Goeman, 2018)
	Hire e-learning teachers who organize regular sessions and consulting hours	PM, PT	(Schoop et al., 2016)
12. Teacher support	Implement peer to peer teacher classroom observations for discussions and reflection	T, PT	(Adekola et al., 2017; Berglund et al., 2017)
	Provide long term support through mentors, consultants, D-guides, center for university didactics	H, PM, IT	(Berglund et al., 2017; Charbonneau-Gowdy & Chavez, 2018; Collyer & Campbell, 2015; Daniel et al., 2018; Dion et al., 2018.; Schoop et al., 2016)
	Provide emotional support and exemption of other tasks	H, PM	(Schoop et al., 2016; Van Twembeke & Goeman, 2018)
13. Student inclusion	Include students in decision-making processes from the beginning, create student-staff collaborations, hire students for the development and planning of FCs	PT, T	(Adekola et al., 2017; Daniel et al., 2018; Harris et al., 2016; Hurtubise et al., 2015)
14. Student support	Offer classes for media skills, techniques to study efficiently and time management	PT, T, IT	(Schoop et al., 2016)
<i>(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students</i>			

**Removal of Barriers:** Removing barriers is the most important task to lower the resistance of involved

stakeholders. In terms of finances, the HEI management and the project team need to develop a plan for sustainable financing of the infrastructure, technologies, and personnel needed for the FC (Liebscher et al., 2015), that goes further than just start-up funding (Schoop et al., 2016). One barrier is the fear or lack of digital literacy of teachers. The literature search resulted in many articles that pointed out the importance of specific training for teachers. There are for example 30 credit graduate classes for teaching e-learning classes (Dion et al., o. J.), and the possibility of hiring e-learning coaches, who offer introductions to FC teaching, workshops and regular courses (Collyer & Campbell, 2015). E-learning coaches should offer regular consultation hours, so that inexperienced as well as advanced teachers can always ask the questions that are relevant for their individual level of FC implementation and the problems that might occur during a semester (Collyer & Campbell, 2015; Daniel et al., 2018), e.g. about new ways of online assessments or decreasing attendance rates. The aim of the training is to give lecturers both confidence and support in order to effectively prepare excellent teaching (Schoop et al., 2016). Van Twembeke and Goeman pointed out the need for customized materials for teachers, that are easy to understand, and provided in the teacher's language (Van Twembeke & Goeman, 2018). Teachers should receive ongoing support from mentors or a university center for HEI didactics (Charbonneau-Gowdy & Chavez, 2018; Daniel et al.,

2018). At the DHBW Karlsruhe for example, information systems students are trained as D-Guides (digital guides) over the course of eight weeks. They then help teachers to transform their lectures to FCs. Usually three D-guides get appointed to one teacher for ten weeks, which equals 300 hours of the additional workforce for the teacher to redesign a course (Daniel et al., 2018).

**Collaboration:** Many authors named collaboration, both inside and outside of the university, as an impactful factor for a successful FC implementation. Within the HEI, the project team should establish communities of practice for teachers to learn together (Schoop et al., 2016), where more experienced FC teachers present their accomplishments and learning materials (Charbonneau-Gowdy & Chavez, 2018; Liebscher et al., 2015; White et al., 2016). Teachers can talk about pedagogical issues (Adekola et al., 2017) and have a discussion in a collegial setting (Berglund et al., 2017). These communities can be powerful motivators for extending e-learning (Adekola et al., 2017; Schoop et al., 2016). To enhance teaching competence, the KTH Royal Institute of Technology (Sweden) organized classroom observations, where teachers visited each other's BL lectures in small groups, followed by discussions and reviews of the observations (Berglund et al., 2017). They also appointed part-time pedagogical developers (PDs) in faculties who facilitate networking and knowledge exchange among faculty members (Van Twembeke & Goeman, 2018). Hutchings and Quinney describe the networking with other HEIs and with experts of different disciplines facilitated through the HEA Enhancement Academy (UK) as a powerful resource of information and support (Hutchings & Quinney, 2015). Not only experiences can be shared in cross-university networks, but they can also be used to share learning materials and carry out joint online assessments (Schoop et al., 2016). Dion et al. report on EIT Digital, a Knowledge and Innovation Community funded by the European Union that offers a European network for universities who want to adapt BL (Dion et al., 2018). Each involved university designates an experienced local coordinator, who leads the CM at his university and also attends multiple physical coordinator meetings to share results and feedback (Dion et al., 2018).

Table 5: Collaboration.

No.	Specific CM tasks	Stakeholder	Ref.
15. Community	Build communities of practice for teachers with different backgrounds or communities of knowledge for experts	PT	(Berglund et al., 2017; Schoop et al., 2016; Van Twembeke & Goeman, 2018; White et al., 2016)
	Organize networking events for all stakeholders to share experience	PT	(Adekola et al., 2017; Schoop et al., 2016)
	Establish cross-university networks and name local coordinators who share experiences in regular meetings	H, PT	(Berglund et al., 2017; Dion et al., o. J.; Schoop et al., 2016)
16. Peer mentoring	Organize peer mentoring by early adapters, facilitate classroom observations	PT	(Adekola et al., 2017; Berglund et al., 2017; Charbonneau-Gowdy & Chavez, 2018; Liebscher et al., 2015)
(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students			

Table 6: Feedback and adjustments.

No.	Specific CM tasks	Stakeholder	Ref.
17. Feedback	Survey students and teachers, examine learning outcomes, collect data on quality measures	PT, T	(Collyer & Campbell, 2015; Hurtubise et al., 2015)
18. Improvement	Use survey and feedbacks in class and training sessions to constantly monitor and improve the outcomes	PT, T	(Collyer & Campbell, 2015; Hurtubise et al., 2015)
19. Results	Share feedback locally first, then share in education and technology publications and with the e-learning community	PT, T	(Hurtubise et al., 2015)

(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students

**Feedback and Adjustments:** During and after the implementation of an FC, it is important to regularly collect feedback of students and teachers, e.g., using qualitative surveys (Collyer & Campbell, 2015). Feedback like students' perceptions of the process, discussed locally, amongst teachers, in project meetings or with HEI management (Hurtubise et al., 2015) and it has to be decided which changes should be made accordingly to the feedback. The assessed data should be compared to previous years; gathered longitudinal data on curricula outcomes could also be shared with the (inter-)national community (Hurtubise et al., 2015).

Table 7: Motivation of stakeholders.

No.	Specific CM tasks	Stakeholder	Ref.
20. Incentives	Create rewarding systems that reward engaged staff with scholarship and promotions	H, F	(Adekola et al., 2017)
	Provide prizes for involved staff, e.g. for "Educational development of the year"	H	(Berglund et al., 2017)
	Offer extra funding for teachers and faculties	H	(Schoop et al., 2016)
	Work on real-world projects with real customers during in-class time as incentive for students	C, T	(Pisoni, Marchese, & Renouard, 2019)
21. Information	Show teachers benefits of using technology, like better pedagogical practice, more flexibility for students, better learning outcomes; communicate benefits in presentations	PM	(Collyer & Campbell, 2015)

22. Voluntaryness	Work with teachers who volunteer first, start pilots and test materials	PM, PT	(Charbonneau-Gowdy & Chavez, 2018; Collyer & Campbell, 2015; Daniel et al., 2018; Hurtubise et al., 2015; Owen & Dunham, 2015)
23. Acknowledgement	Show teachers that their hard work is valued and communicate it openly	H, F	(Van Twembeke & Goeman, 2018)
24. Needs	Survey students and find out about their fears and wishes (e.g., 75% prefer BYOD)	PT	(Bondarev, 2018)
	Survey well-being and current workload of staff as well as their digital literacy and their wishes for training	PT, F	(Daniel et al., 2018; Van Twembeke & Goeman, 2018)

(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students

**Motivation of Stakeholders:** Since implementing an FC takes a lot of time and effort, HEIs can motivate teachers by using tangible incentives (Berglund et al., 2017), like providing additional funds for rewards and prizes (Berglund et al., 2017; Schoop et al., 2016). It is also important to recognize the efforts publicly, as colleagues and learners are often unaware of the workload an FC implementation requires (Van Twembeke & Goeman, 2018). Working with interested teachers who volunteer as early adopters is easier in the beginning since those teachers are already more open to new teaching formats, innovative teaching and the new understanding of

Table 8: Culture and climate.

No.	Specific CM tasks	Stakeholder	Ref.
25. Encouragement	Peer-mentoring for emotional support to help with fear of failure, workshops by early adopters	PT, S, T	(Van Twembeke & Goeman, 2018; White et al., 2016)
	Communicate willingness to fail and learning from mistakes	H, F, PM	(Adekola et al., 2017; Charbonneau-Gowdy & Chavez, 2018)
	Establish a CM Process that gives stakeholders time to free themselves from old patterns	H, PM	(Daniel et al., 2018; Liebscher et al., 2015)
26. Team spirit	Work together on institutional success, open communication, and trust	H, PT, T	(Berglund et al., 2017)
27. Appreciation	Provide public recognition of success, reward accomplishments but also appreciate basic efforts	H, PM	(Adekola et al., 2017; Berglund et al., 2017; Van Twembeke & Goeman, 2018)

(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students

roles (Daniel et al., 2018). Experimental approaches should be encouraged, and early adopters can then promote FCs and peer mentor other teachers (Adekola et al., 2017; Daniel et al., 2018).

**Culture and Climate:** The predominant culture in the institution has a large impact on the successful change to FC, but it is a long and complex process to change the culture itself. If the HEIs culture penalizes failure, it can lead to more risk-averse teachers and staff, who then, out of fear, are not willing to try out innovations anymore. Therefore, management should communicate that they will back teachers up if any of their FC implementations fail (Adekola et al., 2017; Charbonneau-Gowdy & Chavez, 2018). The results of 18 interviews with FC teachers showed that they had to deal with negativity of colleagues inside and outside of their own department who were skeptical towards e-learning and it created an atmosphere of distrust, which can potentially lead the change management process to fail (Owen & Dunham, 2015). Encouragement from colleagues and a cooperative climate seem to be major factors for the engagement of single teachers and overall successful e-learning projects (Owen & Dunham, 2015; Van Twembeke & Goeman, 2018; White et al., 2016). The fear of failure, especially from older or digitally less literate teachers should be taken seriously (Van Twembeke & Goeman, 2018) as they need emotional support (Daniel et al., 2018) and a slow and gentle change management process in order not to feel overwhelmed or frustrated (Liebscher et al., 2015).

Table 9: Infrastructure and technology.

No.	Specific CM tasks	Stakeholder	Ref.
28. Infrastructure	Cooperate with facility management and build flexible learning spaces for students, redesign laboratory space for group works and discussions, provide teachers with shared workspaces	H, PM, PT	(Adekola et al., 2017; Nordquist et al., 2016; Pisoni et al., 2019; Van Twembeke & Goeman, 2018)
29. Technology	Avoid untested technologies and tools, keep it small and simple and start with basic functionalities, focus on reliability, stability high performance and user experience	IT, PM, PT	(Charbonneau-Gowdy & Chavez, 2018; Collyer & Campbell, 2015; Daniel et al., 2018; Dion et al., o. J.)
30. Usage	Provide support for students and teachers, maintain the systems and keep them up-to-date	IT	(Adekola et al., 2017; Collyer & Campbell, 2015; Dion et al., o. J.)
(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students			

**Infrastructure and Technology:** It is often overlooked that the HEI should redesign learning spaces to support FC teaching. Students need flexible, interactive workspaces with good internet access to prepare the online-materials (Adekola et al., 2017; Pisoni et al., 2019) and for the interactive, group work in-class activities, rooms with flexible furniture, soundproof room dividers and touch screen monitors with shared screens support FC teaching (Nordquist et al., 2016). If teachers decide to use online exams, spacious laboratory rooms are needed as well (Hutchings & Quinney, 2015). Concerning the technology, the FC project team should introduce well-established up-to-date solutions, preferably from vendors with a long history and ongoing support (Collyer & Campbell, 2015). All technology, including the Learning Management Systems (LMS) has to be reliable, stable and efficient; otherwise teachers and students can get frustrated and reject the technology (Charbonneau-Gowdy & Chavez, 2018; Daniel et al., 2018). Technical support for students and teachers has to be guaranteed at all times (Collyer & Campbell, 2015).

Table 10: Communication.

No.	Specific CM tasks	Stakeholder	Ref.
31. Discussions	Conduct periodic peer discussions and regular stakeholder meetings in which preconceptions about FC can be rectified	PM, PT	(Charbonneau-Gowdy & Chavez, 2018; White et al., 2016)
32. Linkaging	Support internal systems for communication and create communities of practice	H, PM	(Van Twembeke & Goeman, 2018)
33. Enlightning	Communicate with the students in the early beginning of FC projects, explain the benefits, expectations and their responsibilities	T	(Adekola et al., 2017; Dann, 2019; Harris et al., 2016; Morisse, 2016)
34. Visualization	Promote achievements in a staff meeting, via e-mails and newsletters	PM, H	(Collyer & Campbell, 2015; Van Twembeke & Goeman, 2018; White et al., 2016)
	Organize e-teaching events for the community	PT	(Schoop et al., 2016)
(H) HEI management, (F) faculty chairs, (T) teachers, (C) curriculum designers, (PM) FC project manager, (PT) FC project team, (IT) IT staff, (S) students			

**Communication:** Communication is important during all CM tasks. Communication can be internal, within the HEI, e.g., amongst teachers, amongst teachers and students or HEI management and other stakeholders. The tone of communication is crucial;



constructive discussions should be promoted (White et al., 2016), and an atmosphere where every stakeholder is allowed to openly talk about the impacts of FCs without feeling judged should be ensured (Charbonneau-Gowdy & Chavez, 2018). When the project team or the HEI management talk to instructors, it is important to do so according to the teacher's reality and objectives; instead of using technical terms, product or vendor's names (Collyer & Campbell, 2015). Teachers need to clearly communicate with students, especially during the early stages of implementing an FC. Students have to adjust to the new teaching model and to new ways to learn (Harris, Harris, Reed, & Zelihic, 2016), e.g. more independently and self-paced when working on online lectures. They need explanations about the benefits of an FC as well as the teachers telling them explicitly what is expected from them in an FC (Adekola et al., 2017; Dann, 2019), e.g. being prepared before in-class activities. External communication and promotion of the FC project are also crucial. HEIs could use newsletters to inform about the latest FC developments, show demonstrations, make FC pilots available outside of the institution or organize an e-teaching day as the TU Dresden did in 2015 (Collyer & Campbell, 2015).

## 5 CONCLUSION

To fully exploit the possibilities of an FC, the consideration of a CM strategy is essential (Hurtubise et al., 2015). Our literature research has shown that many authors have recognized the important role of CM in the DT of education. However, how to convert this awareness into practice? To empower stakeholders to manage the change to FC by involving them to reduce resistance and to increase motivation, we identified specific CM tasks from literature for different stakeholder groups and built a FC<sup>CM</sup> guideline. The guideline consists of ten upper categories, which include a total of 34 recommendations of action and 58 specific tasks, as well as further explanations and examples.

The most common topics in the selected articles were communication and collaboration, especially amongst teachers. Institutions should encourage stakeholders to discuss and exchange ideas and support new structures for networking, within their own institution and in cross-university networks. In most cases, the tasks described in our guideline can be assigned to several stakeholder groups, who have to work together. Successful fulfillment is therefore generally dependent not only on one group of people

but on functioning cooperation between different groups. Our findings show how important it is to recognize that a sustainable and successful FC transformation must be supported by all stakeholders, not just by single motivated teachers, as often described in case studies. This is also supported by observations of some researchers, that neither just a bottom-up or only a top-down approach effectively work for the FC implementation, but a combination of both (Charbonneau-Gowdy & Chavez, 2018; Liebscher et al., 2015; Van Twembeke & Goeman, 2018).

We rate the FC<sup>CM</sup> guideline as useful for researchers and practitioners who are interested in a holistic view of the change process accompanying the implementation of FCs at HEIs. We consider all stakeholders in our guideline, compared to others that solely focus on the inclusion of teachers and students. Our guideline creates an awareness of which tasks one has to perform oneself and which tasks have to be performed by other persons in order for the change to FC to succeed. Therefore, we think that the guideline leads to a more transparent distribution of tasks as well as to a better mutual understanding of the affected groups. We provide an overview of recommendations for action as well as concrete tasks and current examples from the literature. Our guideline is easy to understand and can be extended by the user. As our model does not claim to be complete, with this paper, we like to encourage other researchers to look for recommendations for action and publish their findings to enlarge the research field. We aim to build a basis for discussion for researchers and practitioners to enhance effective FC implementations. For further development, we aim to evaluate the guideline. With the help of qualitative interviews, we will iteratively improve our results and include different views from all types of stakeholders. Relevant stakeholders for the interviews will be lecturers, students, student tutors, IT staff, and –to bridge the gap between administration and student needs– program coordinators and HEI management. The proceeding of the evaluation will orient towards the principles of model evaluation (Frank, Fettke, & Loos, 2007; Österle & Otto, 2010). We also consider developing an agile version of the FC<sup>CM</sup> model.

Although we based our guideline on well-prepared literature research, it is possible that other models exist, that would be suitable as well. Depending on the size, equipment and financial resources of an HEI, fewer or different stakeholder groups than those mentioned here could be affected by the change, which would lead to a different distribution of tasks. Before the guideline can be applied, it is advisable to

identify all affected stakeholder groups. Research that presents the application of the guideline within case-studies could deliver further valuable improvement.

## REFERENCES

- Adams Becker, S., Cummins, M., Davis, A., Hall Giesinger, C., & Ananthanarayanan, V. (2017). NMC Horizon Report: 2017. *Higher Education Edition*. <https://www.nmc.org/publication/nmc-horizon-report-2017-higher-education-edition/>
- Adekola, J., Dale, V. H. M., & Gardiner, K. (2017). Development of an institutional framework to guide transitions into enhanced blended learning in higher education. *Research in Learning Technology*, 25(0), 1–16. <https://doi.org/10.25304/rlt.v25.1973>
- Berglund, A., Havtun, H., Jerbrant, A., Wingård, L., Andersson, M., Hedin, B., & Kjellgren, B. (2017). The pedagogical developers initiative—Systematic shifts, serendipities, and setbacks. *13th International CDIO Conference*, 497-508.
- Bishop, J. L., & Verleger, M. A. (2013). The flipped classroom: A survey of the research. *ASEE National Conference Proceedings, Atlanta, GA*, 30, 1–18.
- Bondarev, M. (2018). University Students' Readiness For E-Learning: Replacing Or Supplementing Face-To-Face Classroom Learning. *18th PCSF 2018 - Professional Culture of the Specialist of the Future*, 1151–1160. <https://doi.org/10.15405/epsbs.2018.12.02.124>
- Charbonneau-Gowdy, P., & Chavez, J. (2018). Endpoint: Insights for theory development in a blended learning program in Chile. *17th European Conference on e-Learning, ECEL 2018*, 81–89.
- Chiang, F., & Chen, C. (2017). Modified Flipped Classroom Instructional Model in „Learning Sciences“ Course for Graduate Students. *The Asia - Pacific Education Researcher*, 26(1–2), 1–10. <https://doi.org/10.1007/s40299-016-0321-2>
- Collyer, S., & Campbell, C. (2015). Enabling Pervasive Change: A Higher Education Case Study. *EdMedia+ Innovate Learning, Association for the Advancement of Computing in Education (AACE)*, 249-255.
- Daniel, M., Hüther, J., & Ohngemach, C. (2018). Smile-Studierende als Multiplikatoren für innovative und digitale Lehre. *DeLFI 2018-Die 16. E-Learning Fachtagung Informatik*, 57-68.
- Dann, C. E. (2019). Blended Learning 3.0: Getting Students on Board. In V. L. Uskov, R. J. Howlett, L. C. Jain, & L. Vlacic (eds.), *Smart Education and e-Learning 2018*, 214–223. [https://doi.org/10.1007/978-3-319-92363-5\\_20](https://doi.org/10.1007/978-3-319-92363-5_20)
- Debuse, J. C. W., Lawley, M., & Shibl, R. (2008). Educators' perceptions of automated feedback systems. *Australasian Journal of Educational Technology*, 24(4), 374-386. <https://doi.org/10.14742/ajet.1198>
- Dion, G., Dalle, J.-M., Renouard, F., Guseva, Y., León, G., Mutanen, O.-P. Stranger, A.P., Pisoni, G., Stoycheva, M., Tejero, A., Vendel, M. (2018). Change Management: Blended Learning Adoption in a Large Network of European Universities. 1-8.
- Dusick, D. M., & Yildirim, S. (2000). Faculty Computer Use and Training: Identifying Distinct Needs for Different Populations. *Community College Review*, 27(4), 33–47. <https://doi.org/10.1177/009155210002700403>
- Flavell, H., Harris, C., Price, C., Logan, E., & Peterson, S. (2018). Empowering academics to be adaptive with eLearning technologies: An exploratory case study. *Australasian Journal of Educational Technology*, 35, 1–15. <https://doi.org/10.14742/ajet.2990>
- Frank, U., Fettke, P., & Loos, P. (2007). Evaluation of Reference Models. In *Reference Modeling for Business Systems Analysis* (S. 118–140). IGI Global.
- Garrison, D. R., & Vaughan, N. D. (2013). Institutional change and leadership associated with blended learning innovation: Two case studies. *The Internet and Higher Education*, 18, 24–28. <https://doi.org/10.1016/j.iheduc.2012.09.001>
- Güzer, B., & Caner, H. (2014). The Past, Present and Future of Blended Learning: An in Depth Analysis of Literature. *Procedia - Social and Behavioral Sciences*, 116, 4596–4603. <https://doi.org/10.1016/j.sbspro.2014.01.992>
- Harris, B. F., Harris, J., Reed, L., & Zelihic, M. M. (2016). Flipped classroom: Another tool for your pedagogy tool box. *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL conference*, 43, 325–333.
- Herzfeldt, A., Kristekova, Z., Schermann, M., & Krmar, H. (2011). A Conceptual Framework of Requirements For The Development of E-Learning Offerings From a Product Service System Perspective. *AMCIS*, 1–10.
- Howard, S. K. (2013). Risk-aversion: Understanding teachers' resistance to technology integration. *Technology, Pedagogy and Education*, 22(3), 357–372. <https://doi.org/10.1080/1475939X.2013.802995>
- Hurtubise, L., Hall, E., Sheridan, L., & Han, H. (2015). The Flipped Classroom in Medical Education: Engaging Students to Build Competency. *Journal of Medical Education and Curricular Development*, 2, 35–43. <https://doi.org/10.4137/JMECD.S23895>
- Hutchings, M., & Quinney, A. (2015). The flipped classroom, disruptive pedagogies, enabling technologies and wicked problems: Responding to 'the bomb in the basement'. *Electronic Journal of E-Learning*, 13, 106–119.
- Iqbal, S., Ahmad, S., & Willis, I. (2017). Influencing Factors for Adopting Technology Enhanced Learning in the Medical Schools of Punjab, Pakistan. *International Journal of Information and Communication Technology Education (IJICTE)*, 13(3), 27–39.
- Lee, J., Lim, C., & Kim, H. (2017). Development of an Instructional Design Model for Flipped Learning in Higher Education. *Educational Technology Research and Development*, 65(2), 427–453. <https://doi.org/10.1007/s11423-016-9502-1>

- Liebscher, J., Petschenka, A., Gollan, H., Heinrich, S., van Ackeren, I., & Ganseuer, C. (2015). E-Learning-Strategie an der Universität Duisburg-Essen—Mehr als ein Artefakt? *Zeitschrift für Hochschulentwicklung*, *10*(2), 93–109. <https://doi.org/10.3217/zfhe-10-02/07>
- McLean, S., Attardi, S. M., Faden, L., & Goldszmidt, M. (2016). Flipped classrooms and student learning: Not just surface gains. *Advances in Physiology Education*, *40*(1), 47–55. <https://doi.org/10.1152/advan.00098.2015>
- Morisse, K. (2016). Inverted Classroom in der Hochschullehre—Chancen, Hemmnisse und Erfolgsfaktoren. *Das Inverted Classroom Modell. Begleitband zur 5. Konferenz Inverted Classroom and Beyond*, 1–11.
- Nordquist, J., Sundberg, K., & Laing, A. (2016). Aligning physical learning spaces with the curriculum: AMEE Guide No. 107. *Medical Teacher*, *38*(8), 755–768. <https://doi.org/10.3109/0142159X.2016.1147541>
- Österle, H., & Otto, B. (2010). Consortium Research. *Business & Information Systems Engineering*, *2*(5), 283–293. <https://doi.org/10.1007/s12599-010-0119-3>
- Owen, H., & Dunham, N. (2015). Reflections on the Use of Iterative, Agile and Collaborative Approaches for Blended Flipped Learning Development. *Education Sciences*, *5*(2), 85–103. <https://doi.org/10.3390/educsci5020085>
- Pisoni, G., Marchese, M., & Renouard, F. (2019). Benefits and Challenges of Distributed Student Activities in Online Education Settings: Cross-University Collaborations on a Pan-European Level. *2019 IEEE Global Engineering Education Conference (EDUCON)*, 1017–1021. <https://doi.org/10.1109/EDUCON.2019.8725194>
- Said, M. N. H. M., & Zainal, R. (2017). A Review of Impacts and Challenges of Flipped-Mastery Classroom. *Advanced Science Letters*, *23*(8), 7763–7766. <https://doi.org/10.1166/asl.2017.9571>
- Schoop, E., Köhler, T., Börner, C., Schulz, J. (2016). Consolidating eLearning in a Higher Education Institution: An Organisational Issue integrating Didactics, Technology, and People by the Means of an eLearning Strategy. *Proceedings of 19th Conference GeNeMe*, 39-50.
- Schryen, G. (2015). Writing Qualitative IS Literature Reviews—Guidelines for Synthesis, Interpretation, and Guidance of Research. *Communications of the Association for Information Systems*, *37*, 286–325. <https://doi.org/10.17705/1CAIS.03712>
- Triantafyllou, E., & Timcenko, O. (2015). Student behaviors and perceptions in a flipped classroom: A case in undergraduate mathematics. *Proceedings of the Annual Conference of the European Society for Engineering Education 2015 (SEFI 2015)*.
- Van Twembeke, E., & Goeman, K. (2018). Motivation gets you going and habit gets you there. *Educational Research*, *60*(1), 62–79. <https://doi.org/10.1080/00131881.2017.1379031>
- Webster, J., & Watson, R. T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review. *MIS Quarterly*, *26*(2), xiii–xxiii.
- White, P. J., Larson, I., Styles, K., Yuriev, E., Evans, D. R., Rangachari, P. K., ... Naidu, S. (2016). Adopting an active learning approach to teaching in a research-intensive higher education context transformed staff teaching attitudes and behaviours. *Higher Education Research & Development*, *35*(3), 619–633.