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RELEVANT ASSESSMENT AND PEDAGOGIES FOR INCLUSIVE DIGITAL EDUCATION

IO 1.2 TEACHING SCENARIOS

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Abstract:	This output is part of the IO1 Open educational resources and e-course for flipped classroom (FC) and work based learning (WBL) presenting the learning scenarios used by project partners. The document includes 11 different cases using flipped classroom and work-based learning teaching methods.
Key words	flipped classroom, work-based learning, teaching scenarios, COVID-19, pedagogy, learning experience, teachers, students

EXECUTIVE SUMMARY

This report is part of IO1: Open educational resources and e-course for flipped classroom and work-based learning of the EU RAPIDE project. This report shares the lived experiences and insights from implementations and evaluations of six blended/online work-based learning (WBL) teaching scenarios at Goethe University, Open University UK, and University of Zagreb. Furthermore, it shares the lived experiences from five blended/online flipped classroom (FC) teaching scenarios at Goethe University and the Open University. Using a case-study approach we interviewed teachers in these eleven case-studies using a systematic approach in order to explore what made these WBL and FC teaching scenarios effective (or not) for students to learn 21st century skills (e.g., communication, team working, creativity).

As is evidenced in each of these case studies, substantial different learning design and pedagogical decisions were made. These decisions were in part influenced by the respective culture of the organisation and the discipline in which the teaching scenario was implemented. Some institutions like the Open University have already had a long history of providing WBL in blended and online formats due to the nature of their distance learning settings, while in other institutions some individual teachers provided substantial innovations. In particular during the pivot of COVID-19 an increasing number of teachers moved toward online WBL and online FC over time in order to cope with the pandemic and the need to continue to provide some relevant lived experiences for their students.

Furthermore, the type of students and the main pedagogical challenge (e.g., creating engaging team working experiences, identifying plant species or medical diagnosis, working on a virtual telescope at a distance, being able to work on authentic business network) substantially influenced how teachers designed their respective teaching scenarios. Furthermore, whether (or not) they received support from other researchers and decision makers substantially influenced the ambition, size, and

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scope of the innovation over time. Some case-studies have managed to substantially publish evidence of effectiveness of their teaching scenarios, while others have found supportive evidence from positive student evaluations.

Finally, it is interesting to note that there is no consensus yet in terms of which technology works well with a respective teaching scenario for FC and WBL. Extremely diverse and interesting technologies were used to provide diverse learning experiences to students, including chat, discussion forums, open design studio, robotic telescopes, virtual learning environments, and/or web-video conferencing.

CONTENTS

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1. Introduction: About the approach used to identify teaching scenarios

As part of IO1: Open educational resources and e-course for flipped classroom and work-based learning for use in an online environment in IO1.2 we defined the teaching scenarios and implementational steps for integration of flipped classroom (FC) and online work-based learning (WBL) methods using the experiences and expertise within the partnership. During the period May - December 2021 the four partners worked together to identify good practice examples of FC and blended/online WBL within their institutions using a jointly created template. Good practices were identified using a range of approaches. First, institutional repositories of publications and scholarly work were searched using keywords of flipped classrooms and WBL. Second, leading scholars and educational experts within respective institutions were contacted to share any good practice in FC and online WBL in their institution. In total five case studies of blended/online WBL were identified within the consortium. In addition, five case studies of flipped classrooms were identified, leading to in total ten unique case studies of innovative teaching scenarios.

The interview template was initially tested at one institution (OU) and afterwards further fine-tuned with the partners. In subsequent 1-2-1 semi-structured interviews with the respective teacher(s) who introduced the FC or WBL teaching scenarios were performed. Each partner interviewed the respective teacher(s) in their local context and language if required.

The interviews were semi-structured and followed three broad phases, although the structure and prompting could change depending on flow of the interview. In the initial phase we explored the context of the teaching scenario and why teachers implemented the respective teaching scenario. In the second phase we specifically focused on either the FC or WBL context. In the third and final phase we specifically focused on the overall effectiveness of the approach.

In the initial phase for both the FC and WBL context a range of five generic questions were asked at the start of the interview (e.g., Tell us a little about your context. When (time) and why (context) did you start to implement WBL/work-integrated learning and/or flipped classroom in your course/context/setting?; Would you consider your approach to be innovative (important at your institution/subject area?)? Why (not)?; What kind of technology/approach did you use to support WBL/flipped classroom?; Which graduate skills (e.g., communication, team working, programming skills) were you aiming to achieve to develop/nurture/strengthen?). Specific prompts were used to gather further details if required, but most teachers were happy to share their insights and perspectives unprompted.

In the second phase, for the FC context, seven specific questions were asked based upon the literature review IO1.1 (Divjak et al., 2022) and the FC framework developed at the GU (e.g., What is the role of the teacher in your learning scenario?; What is the primary learner role in your learning scenario? What degree of individualization of learning processes is used, for example in terms of learning content, level of difficulty, media, learning duration and learning path?). For the WBL context, three specific questions were asked using the findings from the literature review (Rienties et al., Submitted) building on the work of Schuster and Glavas (2017). (How would you define work - based learning from your experience? There are different forms of e-WBL/WIL. Schuster and Glavas (2017) distinguished four types of e-WILs. Which do you think fits in? How does WBL/work-integrated learning fit within your organisation?)

In the third phase, we asked six questions about the overall effectiveness of the approach (e.g., what enabled you to implement this innovation? What problems/challenges have you encountered? Do you have any evidence that your approach works?).

Data analysis

After the interview was completed each partner institution created a case-study using a predefined format (one for WBL, one for FC), including image or illustration of the teaching scenario, introduction and context, description (following the specifications of second phase), conclusion, contact information and further publication info about the teaching scenario (if available). All interviews were transcribed by Otter.ai and checked afterwards for consistency. The interviewer constructed the initial case-study. This case study had a typically short length of 4-5 pages, which ensured that the essence of the teaching scenario was distilled.

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The case-study was afterwards shared with the respective teacher(s) for fact-checking and verification. Afterwards, the case-study was reviewed by another partner institution to make sure that the teaching scenario made sense outside the respective institution, and the case-study was finalized. In other words, each case-study was reviewed by at least two people (interviewer and teacher) within the respective institution, as well as by at least one other reviewer outside the institution to ensure coherence and consistency. Ethics approval was sought by Francisco Iniesto and supported by the Human Ethics Review Committee at the OU. The ethics approval was also given by the Ethics Committee of the Faculty of Organization and Informatics (University of Zagreb).

2. Case-studies

2.1 Blended/online work-based learning (WBL)

2.1.1 Discrete Mathematics with Graph Theory Course (University of Zagreb, Faculty of Organization and Informatics)

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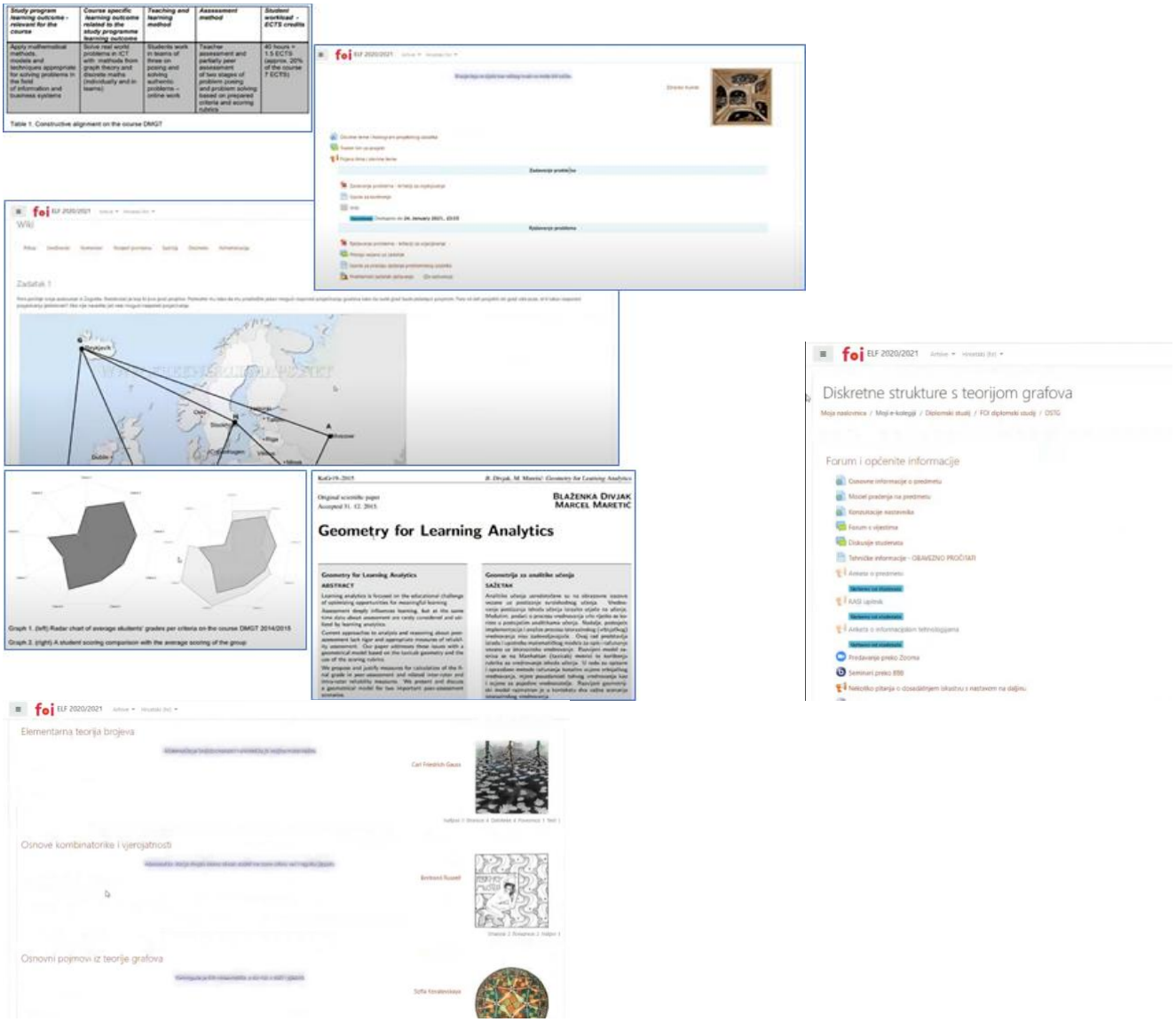

INTRODUCTION AND CONTEXT

The course Discrete Mathematics with Graph Theory (DMGT) is taught on a graduate (master) level and the cohort normally includes 100+ Information Technology (IT) students. The degree of technological involvement is high, it is a technology-based course and the entire work-based learning (WBL) experience for students, teachers and employers is fully online. Teachers put special effort into constructive alignment and carefully relate learning outcomes with teaching and assessment methods (Divjak, 2015).

The DMGT course is divided into two parts, as the title suggests: discrete mathematics and graph theory. Nevertheless, both parts are abstract and complex and, at the same time, they should be applicable because students study IT, not mathematics. The course goals are reflected in six learning outcomes (LOs) that cover mathematical theory and applicability. The LOs in general are not independent of each other, and some outcomes precede others. Some LOs are predominantly abstract and "purely" mathematical, but there are two that are more difficult because students are expected to interpret what they have learned in mathematics, connect it with knowledge and skills from other courses, and develop problem-posing and problem-solving skills essential for their (future) professional life.

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To confirm the achievement of these two LOs, students need to create a solution and assess self-prepared solutions (self-assessment) and solutions prepared by other teams (i.e., peer assessment). LO: "Effective work in a team on problem posing and solving real problems related to graph theory and discrete mathematics" is worth 30% of the final grade and it is prepared as WBL. Students work in teams and in the first phase explore and pose a problem from the real life context. Direct cooperation with employers that work with a few groups of students in the problem posing phase started in 2020. The problems were related to software development, scheduling of work tasks etc. In the second phase the posed problems are shuffled and another team is assigned to solve the problem posed in the first phase. Finally, the students that posed the problem peer assess the solution according to the analytic rubrics. Teachers also assess the solutions and the assessments of students and teachers are compared and discussed against the criteria from the rubric.

In the next period, the plan is to involve employers in the project evaluation phase.

DESCRIPTION

Category (based upon Schutser & Glavas model (2017): technology based

Students

Students are encouraged to be creative and innovative and engaged to use mathematics, algorithms and mathematical way of thinking in posing, describing and solving real world problems, as well as to peer assess others' problem solutions with the help of rubrics and grading criteria previously explained and discussed.

The first phase is problem posing and describing (using a wiki in Moodle). It is learned that not problem solving, but problem posing is difficult and demanding for students. Substantial effort has been put into finding employers to work with students at this phase and to help them to describe a problem from a real-life context. In this phase students ask questions about the tasks, discuss open questions fully online in a synchronous manner. It is concluded that students prefer to ask questions in a synchronous way.

The second phase is problem solving and the problem posed by a particular team is given to another team for solving in the workshop environment in Moodle. For example, the problem to find the optimal distribution of fire alarms in a building that was described by one team has to be solved by some other team (i.e., teacher distributed problems) and the team that posed that problem was given to solve a problem posed by some other team (for example the problem to model the spread of the virus in a certain work setting (e.g., SNA analysis). Teamwork can be traced in the wiki environment integrated into Moodle. Through these two phases the students are not managed and directed by teachers, but guided and the emphasis is on the final product/results, giving students autonomy and more responsibility for their own work.

The problem solution and fulfilments of the criteria are evaluated by experts/teachers and peers using rubrics and analysed, mutually compared and checked for reliability. Finally, the students may compare their achievements with the overall results. Students are also using a dashboard helping them to analyse different aspects, like fulfilment of characteristics of the problem, presentation of the problem, etc. and to compare results from other students.

By working in teams students develop important skills such as teamwork, collaborative learning, communication, presentation, use of different digital tools, etc. They also develop their innovativeness, creativity and interdisciplinarity skills. During the WBL experience students gain other competencies important for their future work as IT professionals.

Teachers

The number of students enrolled in the course is above 100, leading to 30 and 40 teams, which is demanding for teachers to organise, to work with, to advise and also to follow them through two phases of authentic problem posing and problem solving. So, the teacher workload is quite high.

Regarding the feedback from students related to the WBL approach in the course, first the teachers regularly ask students during the course about their achievements and satisfaction level. According to the results, the students are given some support in the challenging areas. Second, teachers analyse the assessment data, the rubric, different measures and use different algorithms to see what clusters of students there are and how to cluster the students related to the results of the

WBL to see if there is a need to further encourage students or to prepare additional activities. Third, it is expected from teachers to bring at least one (small) innovation in their own work each year. Teachers invested huge effort in constructive alignment of the course learning outcomes. They weighted the outcomes and analysed how to approach each outcome.

Researchers

Teachers/researchers involved in this course constantly analyse, rethink, improve and innovate their approaches and methods, present them in the conference and journal papers and implement them in the course and WBL activities. Each academic year, teachers research on students' satisfaction with different aspects of the course as well as fulfilment of LOs, follow research literature, innovate the course but also publish research results (Divjak, 2015; Divjak and Maretić, 2017; Divjak et al, 2021). To illustrate the students perspective, let us mention that all student satisfaction elements (2021) were above the institutional average and that students are particularly satisfied with the assessment approaches.

Decision-makers

Decision makers did not have influence on the WBL implementation in the course. However, since the institution operates in the field of IT , more emphasis is put on WBL in its courses than in some humanistic or pure mathematics study programme(s). It could be said that there is a kind of a consensus around that much more applications should be used but there is not a direct push

CONCLUSION

In the presented course the degree of technological involvement is high, it is technology based and the entire WBL experience is fully online. Regarding the function, there is a pedagogical function of technology since different approaches are used students develop ideas in virtual environment, etc.. Since the course participants are IT students, they interact much more freely with tools and prepare their own tools. Emphasis is placed on the development and improvement of their employability skills, as well as 21st century skills (problem solving, team work). Students' satisfaction level with the course delivery is high.

Students are involved in activities in two phases in which they have an opportunity to experience WBL, to explore and pose a problem from the real life context and to discuss it with employers.

CONTACT

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ADDITIONAL INFORMATION:

1. Divjak, B., Kadoić, N. & Žugec, B. (2021) The Use of Decision-Making Methods to Ensure Assessment Validity. U: 2021 IEEE Technology & Engineering Management Conference - Europe (TEMSCON-EUR) (TEMSCON-EUR 2021). https://rapide-project.eu/sites/default/files/inline-files/Paper_Stamped%20for%20IEEE%20Xplore.pdf

2. Divjak, B. (2015) ASSESSMENT OF COMPLEX, NON-STRUCTURED MATHEMATICAL PROBLEMS. U: M.A. Hersh and M. Kotecha (ur.) IMA International Conference on Barriers and Enablers to Learning Maths: Enhancing Learning and Teaching for All Learners. https://www.bib.irb.hr/855835

3. Divjak, B. & Maretić, M. (2015) Geometry for Learning Analytics. KoG : znanstveno-stručni časopis Hrvatskog društva za konstruktivnu geometriju i kompjutorsku grafiku, 19, 48-56. http://master.grad.hr/hdgg/kog_stranica/kog19/06kog19-Divjak.pdf

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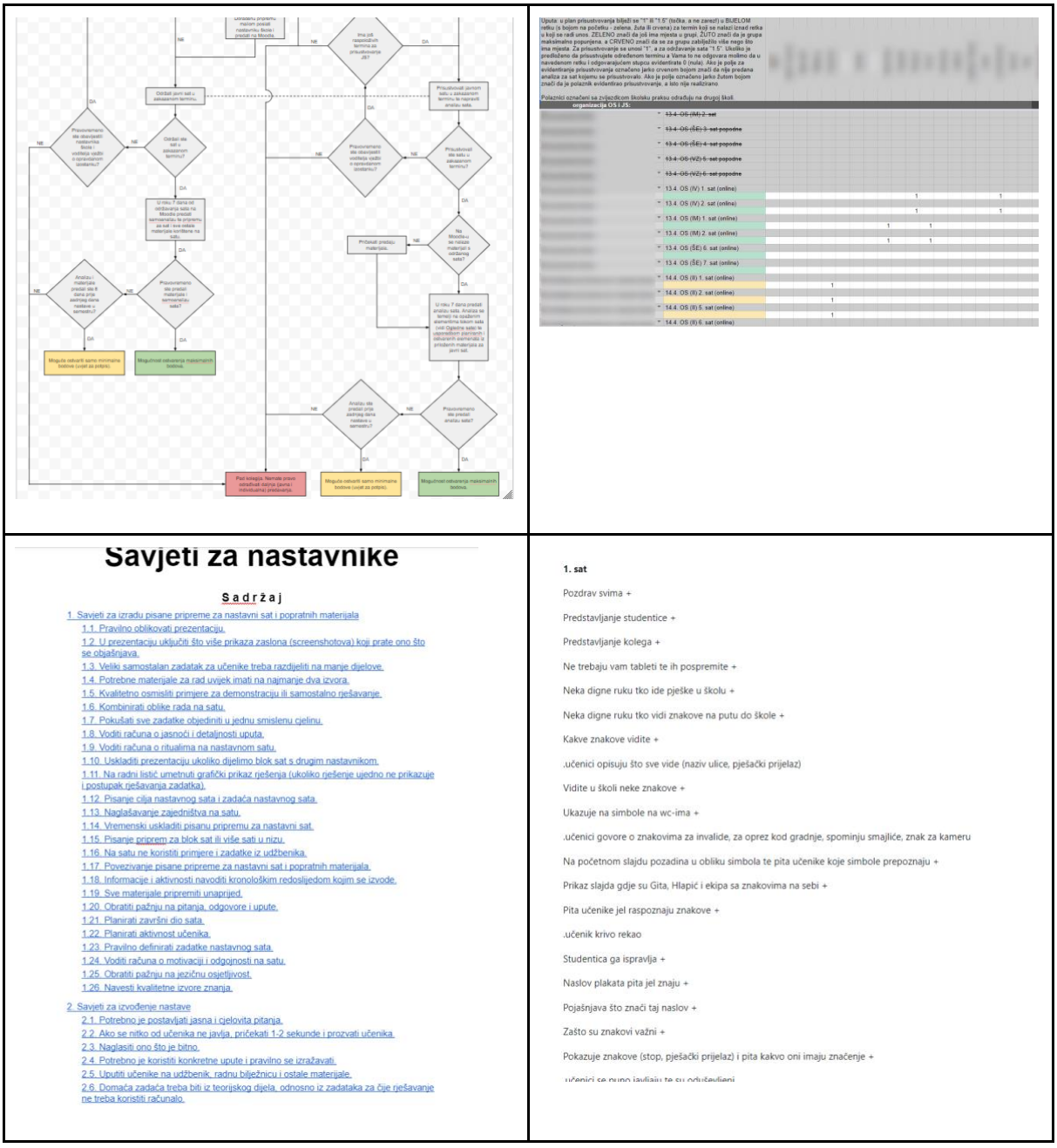
2.1.2 Methods of Teaching Informatics 1 (University of Zagreb, Faculty of Organization and Informatics)



Savjeti za nastavnike

Sadržaj

1. Savjeti za izradu pisane pripreme za nastavni sat i popratnih materijala
   1.1. Pravilno oblikovati prezentaciju.
   1.2. U prezentaciju uključiti što više prikaza zaslona (screenshotova) koji prate ono što se objašnjava.
   1.3. Veliki samostalan zadatak za učenike treba razdijeliti na manje dijelove.
   1.4. Potrebne materijale za rad uvijek imati na najmanje dva izvora.
   1.5. Kvalitetno osmisliti primjere za demonstraciju ili samostalno rješavanje.
   1.6. Kombinirati oblike rada na satu.
   1.7. Pokušati sve zadatke objediniti u jednu smislenu cjelinu.
   1.8. Voditi računa o jasnoći i detaljnosti uputa.
   1.9. Voditi računa o ritualima na nastavnom satu.
   1.10. Uskladiti prezentaciju ukoliko dijelimo blok sat s drugim nastavnikom.
   1.11. Na radni listić umetnuti grafički prikaz rješenja (ukoliko rješenje ujedno ne prikazuje i postupak rješavanja zadatka).
   1.12. Pisanje cilja nastavnog sata i zadaća nastavnog sata.
   1.13. Naglašavanje zajedništva na satu.
   1.14. Vremenski uskladiti pisanu pripremu za nastavni sat.
   1.15. Pisanje priprem za blok sat ili više sati u nizu.
   1.16. Na satu ne koristiti primjere i zadatke iz udžbenika.
   1.17. Povezivanje pisane pripreme za nastavni sat i popratnih materijala.
   1.18. Informacije i aktivnosti navoditi kronološkim redoslijedom kojim se izvode.
   1.19. Sve materijale pripremiti unaprijed.
   1.20. Obratiti pažnju na pitanja, odgovore i upute.
   1.21. Planirati završni dio sata.
   1.22. Planirati aktivnost učenika.
   1.23. Pravilno definirati zadatke nastavnog sata.
   1.24. Voditi računa o motivaciji i odgojnosti na satu.
   1.25. Obratiti pažnju na jezičnu osjetljivost.
   1.26. Navesti kvalitetne izvore znanja.
2. Savjeti za izvođenje nastave
   2.1. Potrebno je postavljati jasna i cjelovita pitanja.
   2.2. Ako se nitko od učenika ne javlja, pričekati 1-2 sekunde i prozvati učenika.
   2.3. Naglasiti ono što je bitno.
   2.4. Potrebno je koristiti konkretne upute i pravilno se izražavati.
   2.5. Uputiti učenike na udžbenik, radnu bilježnicu i ostale materijale.
   2.6. Domaća zadaća treba biti iz teorijskog dijela, odnosno iz zadataka za čije rješavanje ne treba koristiti računalo.

1. sat

Pozdrav svima +

Predstavljanje studentice +

Predstavljanje kolega +

Ne trebaju vam tableti te ih pospremite +

Neka digne ruku tko ide pješke u školu +

Neka digne ruku tko vidi znakove na putu do škole +

Kakve znakove vidite +

.učenici opisuju što sve vide (naziv ulice, pješački prijelaz)

Vidite u školi neke znakove +

Ukazuje na simbole na wc-ima +

.učenici govore o znakovima za invalide, za oprez kod gradnje, spominju smajliće, znak za kameru

Na početnom slajdu pozadina u obliku simbola te pita učenike koje simbole prepoznaju +

Prikaz slajda gdje su Gita, Hlapić i ekipa sa znakovima na sebi +

Pita učenike jel raspoznaju znakove +

.učenik krivo rekao

Studentica ga ispravlja +

Naslov plakata pita jel znaju +

Pojašnjava što znači taj naslov +

Zašto su znakovi važni +

Pokazuje znakove (stop, pješački prijelaz) i pita kakvo oni imaju značenje +

učenici se puno javljaju te su oduševljeni

INTRODUCTION AND CONTEXT

The course Methods of Teaching Informatics (MoTI) is taught on the graduate (master) level and the course is usually enrolled by a smaller number of students, around 10. The course consists of lectures and exercises which are split into two types: on-site exercises and follow-up activities. During the course focus is placed on the quality of the teaching process during the on-site exercises with a special emphasis on the follow-up activities (e.g., self-assessment and peer-assessment, incorporating new feedback and ideas into future planning, consideration of new cases for the “best practices” document, etc.).

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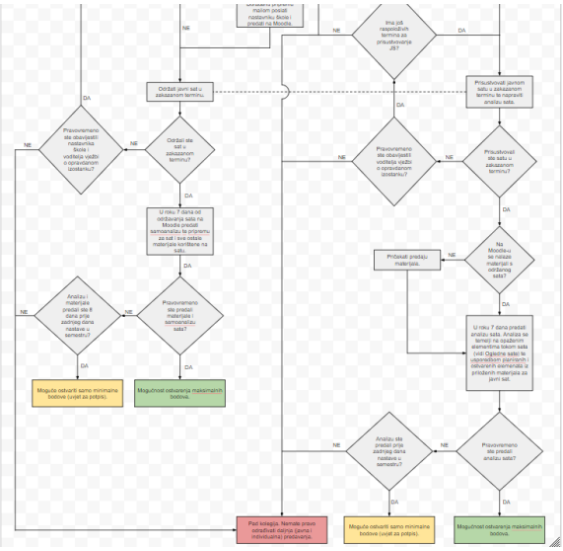

Figure 2.1.6. One of the flow diagrams which helps students through the course structure (section of exercises)

The course consists of 1) traditional lectures where students are presented with relevant information connected to the topic of methods of teaching informatics. Informatics is a mandatory subject in Croatian primary level schools (in 5th and 6th grade) and in some secondary level schools. In the MoTI students prepare for teaching in secondary level schools which is closer to the academic thinking and knowledge, and students in schools are more resilient to the errors done during the on-site exercises. The course also consists of 2) exercises which focus on the on-site practical participation in the real classes (WBL approach). Faculty students attend 2.1) classes held by school teachers, but they also 2.2) give their own classes and 2.3) attend classes held by other students. Follow-up activities, as a part of the exercises, are focused on the analysis of the teaching process.

Lectures are conducted in the traditional way, while the exercises are planned and supported by different tools, from Google Spreadsheets to Moodle Assignments and Forums. Exercises provide 40% of the final course grade. The main focus is placed on the WBL aspect where students either attend or carry out classes in the secondary level schools. Students are supported by peers (especially through peer assessment and constructive feedback), but also school teachers who act as on-site mentors, helping them prepare better for the teaching process.

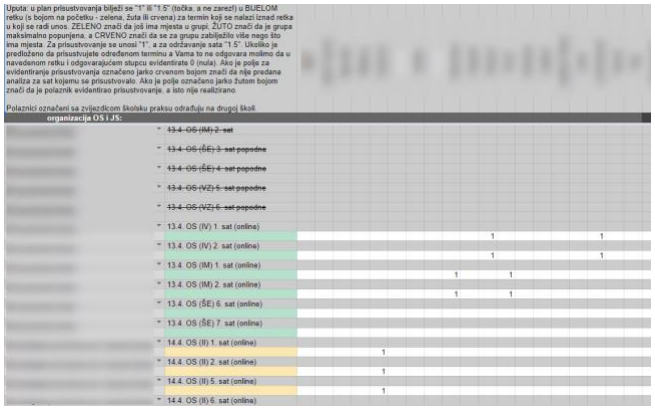

Figure 2.1.6. Example of Google Spreadsheets used for the coordination of exercises

DESCRIPTION

*Category (*based upon Schutser & Glavas model (2017): Technology-Facilitated

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Students

Students are encouraged to create creative, motivating and contemporary teaching practice for secondary school students. It is mandatory to depart from traditional teaching, especially textbook examples and similar practices. After theoretical knowledge they attend secondary school informatics which is held by a school teacher and monitor the teaching practice. After that the whole group conducts the analysis.

A follow-up step is that students conduct classes themselves. That is a rather complex step since it consists of coordination with a school teacher regarding the topic, class and exact date of the teaching, creation of the written preparation for teaching, including all necessary materials, and coordination with other students. The first submission of the written preparation for teaching is done as a Moodle Assignment, while the updated version is submitted publicly, via the Forum, so all students can see how and what their colleague prepared for the class.

The group of students attend a colleague's class. As a part of the follow up activity student who held the class, a group of students and faculty teacher analyse the teaching process. The analysis is also submitted via Moodle Forum, so all students who were present can read what and how others perceived the teaching process.

Teachers

Since the group of students who enrol in the course is rather small, it is usually not a challenge to organize students into groups. The group size depends on the school conditions, ranging from 3 to 8 students. 1) The Teacher organizes and follows students through initial on-site exercises which are conducted by school teachers (mentors). 2) Furthermore, the Teacher supports students in arranging their teaching, as well as creation of teaching materials and written preparation for teaching. 3) The Teacher is present when students give classes and 4) conducts analysis with them. Since this process is ongoing for over a decade, the teacher created a “best practices” guide for students which helps them in the preparation phase with real life examples.

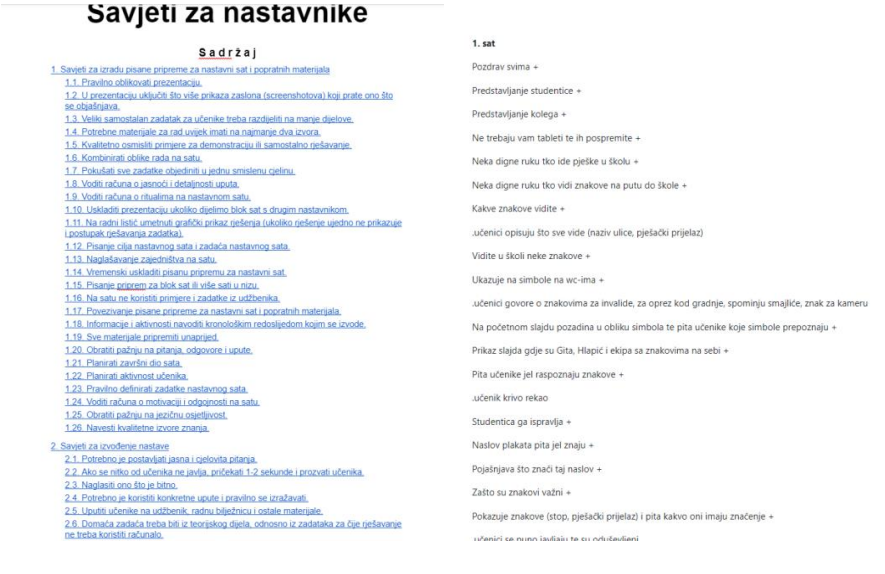

Figure 2.1.6. Section of best-practices document for students (left) and analysis on the forum (right)

Researchers

Teacher/researcher involved in the course analyses and rethinks the practice. Since the course is held for over a decade there have been several major improvements, primarily in the area of used IT tools. Students are highly satisfied with the course and several have found their employment within the schools where they had the exercises.

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Decision-makers

Decision makers support the WBL approach in the course. The course exercises are an outlier on the Faculty, since they are conducted outside the Faculty and Faculty's teaching schedule. Despite all the challenges, decision-makers provide support for the implementation of the WBL in the course.

CONCLUSION

In the presented course the WBL is conducted on-site, in a real school environment. The WBL elements have their pre- and post- activities, with several layers of intertwined elements. Although the course heavily relies on IT tools in some elements, all tools are used to support student's learning, coordination, planning and feedback related to the on-site exercises. Within the course students develop a set of skills which are relevant for their future profession - teachers of informatics. Through the course students gain small, but valuable first hands experience in the teaching profession. Students are involved in most of the steps, including coordination with school teachers (mentors), which further supports development of generic skills, such as communication, work ethics, etc.

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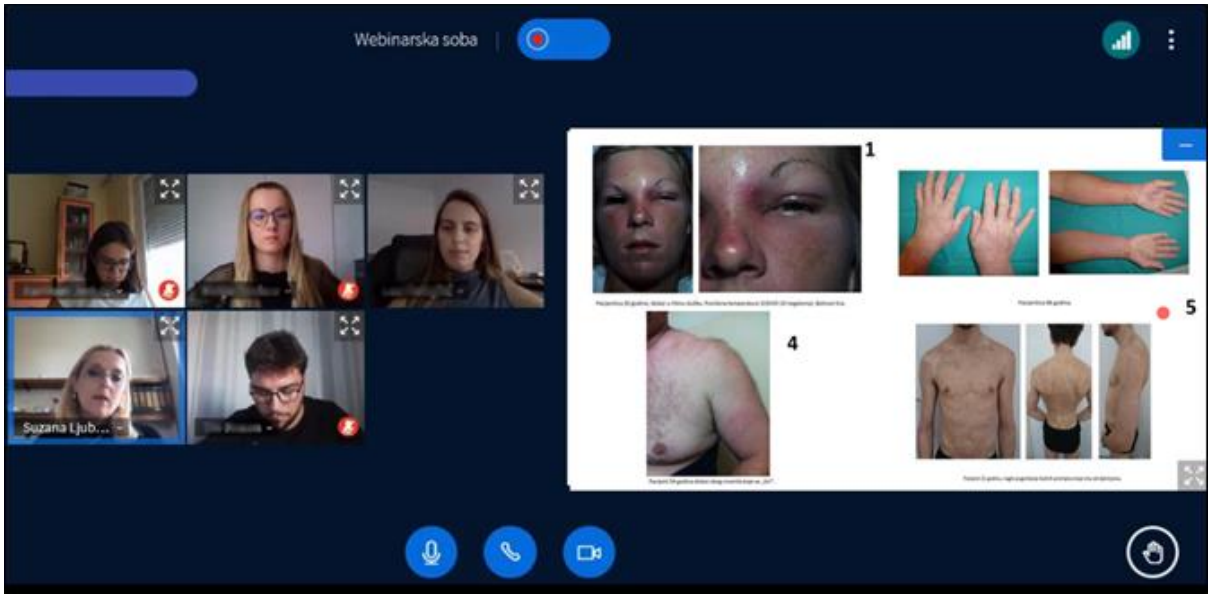
2.1.3 Online Simulated Patient Model (School of Medicine, University of Zagreb)



INTRODUCTION AND CONTEXT

Dermatovenereology is a compulsory clinical course that is taught in the 4th year of the study of medicine, which includes 300+ students. The course's goals are presented in the learning outcomes that cover basic principles and major concepts of dermatology and sexually transmitted diseases. The aim is to develop understanding of the basic science in dermatovenereology, such as providing students with the skills in diagnosis and differential diagnosis, treatment, prognosis, and prophylaxis of the most frequent and important pathological conditions of the skin and venereal diseases in adults and children. In addition, the aim is also to enable students to be effective in various applications in everyday practice with hospitalized and outcoming patients in dermatovenereology. The course is taught for three weeks (70 hours of the teaching) and it has been repeated over eight blocks. Each block comprised 30-40 students, which were divided into 7 groups.

Before COVID-19, the dermatovenereology course was performed as a blended teaching in which class sessions took place in a traditional classroom while the LMS (Moodle) was used for asynchronous learning through delivering e-learning materials such as texts, ppt presentations and video presentation. Most of the education in dermatology incorporates “bedside teaching” (BST) which usually takes place in inpatient care settings (WBL). BST enhances student’s clinical skills in history taking, patient examination, recognition of skin lesions and description of skin clinical findings, and the assessment of skin clinical picture in the context of general health condition of the patient.

The pandemic forced a rapid transition of the course to entirely online teaching. The curriculum is adapted to a new pedagogical design combining two teaching models: the flipped classroom pedagogical model (see also section 2.2) and the patient oriented teaching through introducing the simulated patient (SP) approach. Through the FC method, students were provided with additional educational pedagogical materials in the form of a pre-recorded topic video lecture, interactive text and presentation, as well as with self-assessment quizzes containing practice questions to prepare students for online clinical practice. The bedside teaching (BST), which is normally performed within the clinical ward, was replaced by the online SP approach in which the majority of the work was performed in the virtual BBB room (synchronous mode) in real time. Similar to BST, in SP approach all three key stakeholders - patients, students, and teachers - are three cornerstones of this type of learning. Since a real patient could not be included in online teaching the easiest solution was to unite two roles “patient” and “teacher” into one person playing both roles. The teacher in this SP approach plays both roles.

What can the SP approach do and what context does it work in?

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The SP approach allows students to emulate bedside teaching experience by creating clinical situation similar to the one in real practice

The SP approach attracted the students' interest because of the integration of clinical examination teaching with a clinical scenario

The SP approach increased students' activity during synchronised session because of its active involvement in taking history and physical examination

The SP approach made the learning of history taking and virtual physical examination more easily understandable and relevant

The SP approach helped students to detect gaps in their communications skills and physical examination knowledge and skills which increased students' confidence enough to examine a real patient

This SP approach demonstrates a promising solution to teaching history taking communication skills and practical physical examination skills during the pandemic

The SP approach could be used not only during pandemic but it could have a large implementation in real practice in the case when some specific patient (diseases) are not "available" at clinical ward

Services: BBB video conferencing system integrated in LMS was used as a replacement for in person classes as well as clinical practices. For the presented course, it meant moving some types of high-interaction activities into new formats in which interactive problem solving or small group discussions were placed within the framework of real patient cases. Therefore, bedside teaching performed as WBL at ward was delivered via BBB video conferencing system.

DESCRIPTION

Category (based upon Schutser & Glavas model (2017): the SP approach is a technology blended type of WBL according to the degree of technological involvement.

Students

For medical students an important part of medical education lies in bedside teaching (WBL) through which students usually learn more effectively since they are actively involved in the learning process. Therefore, the whole idea of the SP approach is set to encourage students to become active participants in the learning process. It encourages the development of critical thinking and logical reasoning which results in developing a competent and confident medical student. The SP approach is carried out in a controlled (online) environment through which students gain the clinical skills competence such as communication and clinical reasoning and decision-making as well as conducting a modified physical examination.

By the SP approach students achieve real communication with the "patient" and go through the same educational process they used to go through during live practice at the clinical ward. In addition, the model in which the teacher takes over the role of "simulated patient" has multiple advantages: on one side students in communication with the "patient" acquire the necessary competencies and communication skills, but at the same time have a great opportunity to learn from their mistakes. Since the teacher plays two roles, (s)he can easily switch from one role to another, from patient to teacher and vice versa, and can respond quickly wherever is necessary to correct students' mistakes in communicating with "patients", which is not always the case with a live practice in the ward. The goal of the SP approach is not to solve the problem (diagnose the patient) but rather to encourage the students to work as a team while learning necessary social and problem solving skills.

The SP approach is being implemented in three parts:

In the first part the teacher explains the rules and describes the roles of students in the selected clinical cases. It is learned that presenting clinical cases, based on a real patient case, with basic information in a form of referral letter passed from general practice, was widely accepted by students. Presented information is usually a short description of the medical problems accompanied by pictures of the patient's skin changes. Since 3-6 selected cases were usually presented per session,

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students were divided into small teams of 2-3 students working in break-out-rooms to prepare the strategy on how to approach and communicate with the “patient”.

The second part is the replacement for bedside teaching (BST). In real practice, BST takes place when a teacher takes a group of students to the bedside of a patient where the taken medical history will lead to specific physical examination. Taken together both, medical history and physical examination, will allow students to make a provisional diagnosis that will lead to ordering the best diagnostic and therapeutic options.

In BBB room, the BST is replaced by the SP approach in which the student's communication with the "simulated patient" takes place in an identical way as it would take place at the bedside in the clinical ward. Students address the teacher as a real patient and the teacher answers the students' questions in a way the real patient would do. In communication with the “patient” students gain information by asking specific questions with the aim of obtaining information useful in formulating a diagnosis. Students appreciate such an approach a lot since it enables them to develop good communication skills. At the same time, this approach allows the teacher to focus on the students' approach and actions and to help them where deemed appropriate and necessary which rarely happens when students work at bedside with a real patient.

Obtaining an accurate history is the critical first step in determining the aetiology of a patient’s problems. In real practice, comprehensive history taking can help the physician diagnose a patient's problems, but the diagnosis can become more precise when a physical examination is added. To allow the physical examination that does not need physical contact, the teacher posts visual (pictures showing the skin changes) or auditory (recordings of different pathological sounds such as heart and lung sounds) examples of the patient’s symptoms. The physical examination that requires physical contact with the patient was done in a way that the student describes the physical examination (s)he would perform at the bedside and explain how the teacher would carry out the described examination. Then the teacher would discover the finding that the student would get by physical examination. After the physical examination is over, all students discuss the most probable clinical diagnosis and differential diagnosis.

In the third part, the presented clinical case has to be closed by confirming one of the possible diseases. Students order appropriate clinical tests, such as blood tests and diagnostic imaging (RTG, ECG, ultrasound, etc) necessary to obtain information for confirming the presumptive patient’s diagnosis. For each of these orders the students need to explain the purpose and aim of ordered tests. On student’s demand , the teacher presents the results of the ordered tests and students need to explain what information from each ordered test is important for the final diagnosis. In making the final diagnosis, students rely on various clues such as past medical history, physical signs, and the results of selected laboratory, radiological and other imaging tests.

As stated by students, in situations when working with a real patient is not possible then the SP approach helps to bring in the parts of the clinical practice. In addition, most of the students found it to be a great teaching tool for preparing them for real life clinical practice. They were especially satisfied with the way the teacher would simulate a patient and found it rewarding that they were able to get immediate feedback. In addition, an advantage of using a teacher as a SP gives students the opportunity to clinically assess ‘patients’ in a multi-dimensional manner, which is not possible when images or videos are used only.

Teachers

This SP approach allows a teacher to provide an environment where students can practice a particular interview approach such as history taking skills, communication skills or physical examination skills in an online setting without risking the comfort, modesty, or safety of a "real" patient.

In a carefully prepared case, the teacher prepares all necessary information in advance, such as videos, audio clips, illustrations, and photographs as well as the results of laboratory tests and diagnostic imaging that need to be presented during the case implementation to be shown on students' demand. By providing a chance for asking a question in obtaining a relevant medical history and developing some forms of physical examination skills, through the online SP approach the teacher gives students an excellent opportunity for the modelling of professional behaviours.

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Even though the SP approach, according to the teachers, can never really replace the real bedside teaching at the ward, many of them stated that it is a great opportunity for students to learn how to work as a team and to learn proper communication skills when dealing with the patient. In addition, the advantage of SP approach is the possibility to show the students some diseases that most likely they won't encounter while being at ward during the practical.

Researchers

Researchers involved in this course constantly analyze, rethink, improve and innovate teachers' approaches and methods, present them in the conference and faculty's journal and encourage other departments to implement them in the course and WBL activities. At the end of the course researchers analyze the students' satisfaction with different aspects of the course. To illustrate the students' perspective and opinion about the applied new SP approach, we have to point out that student satisfaction about this course (2020/2021) was above the average among clinical courses. Students declared this course as the best one among all clinical courses (4th-6th year of medical school) and the SP approach was found to be a great teaching tool for preparing them for the real life clinical practice.

CONCLUSION

In the presented course, the bedside teaching as an example of online WBL is conducted entirely in a virtual environment, in real time. It is categorized as technology-blended. The approach is interactive and focused on student-centred learning. The primary purpose of the SP approach is to give students an opportunity to interact with SPs in a way they will do with real patients. Therefore, the technology based environment (LMS and BBB system) is shown to be an acceptable replacement for bedside teaching allowing and encouraging the students to work as a team while learning necessary social and problem solving skills that will be needed in the future.

On the one hand, this SP approach is shown to be even better than the real bedside teaching performed within ward since the teacher, by providing active learning in real context, works with students through entire practical and observes students' skills, increases students' motivation and professional thinking, integrates clinical, communication, problem solving, decision making and ethical skills.

Since students usually learn more effectively when they are actively involved in the learning process, the SP approach is one such active learning process in which the students are actively involved in solving problems through which they have an opportunity to experience WBL, to explore a clinical case from the real life context and to discuss it with teachers. Thus, the SP approach helps to bridge the gap between theory and practice. Students' satisfaction level with the course delivery is high.

Teachers, on the other hand, stated that the possibility of being able to supervise the practice and give immediate feedback had a big influence on the student's knowledge when they were allowed to do ward rounds. According to them, students came to the clinical practice ward more prepared, the interaction with the patient was better and they were capable of diagnosing the patient faster. Although this SP approach could not entirely replace real bedside teaching, at least it can give students a great opportunity to get well prepared for clinical work.

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2.1.4 PT ANYWHERE (THE OPEN UNIVERSITY)

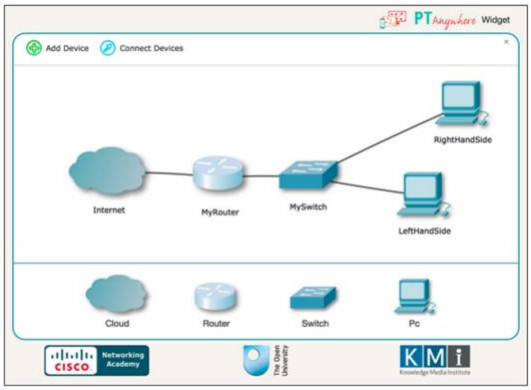
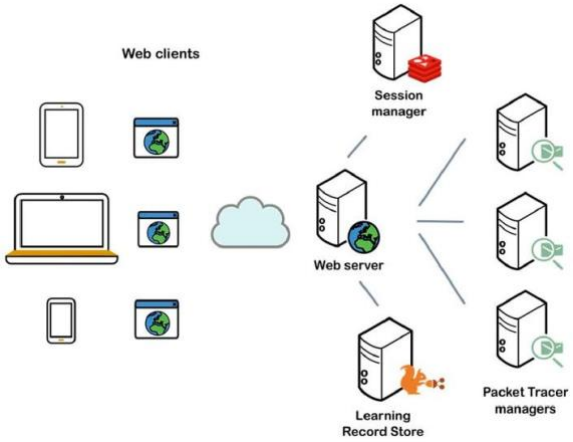
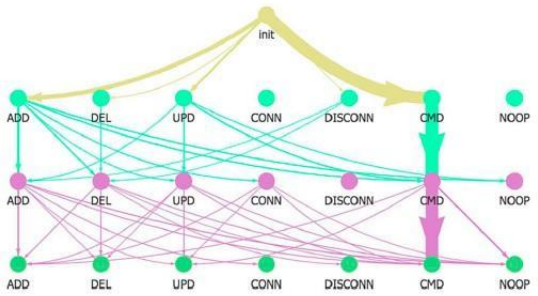


Figure 1. The default network topology of PT Anywhere.





INTRODUCTION AND CONTEXT

The PT Anywhere approach has been jointly developed by the Open University (OU/Knowledge Media Institute) and Cisco in the context of the projects FORGE and Open Networking Lab since 2016. Cisco recognises the potential of PT Anywhere as a novel learning tool, building on top of and extending both the capabilities and audience reach of the Packet Tracer software. The PT Anywhere mobile environment aims at overcoming the barriers to access to specialised digital equipment for acquiring hands-on networking engineering skills. Having the capacity to offer the same technological experience as the hands-on equipment, PT Anywhere offers educators and learners access to rich computational resources via remote and mobile access that are embedded within interactive learning resources.

This is an example of online experimentation/remote/virtual labs. In PT Anywhere the Network simulation tools offer a virtual lab environment where learners can experiment with a variety of virtual network devices and topologies by extending Packet Tracer. This is part of future internet research experimentation (FIRE). Packet Tracer is typically used in situ to offer students the experience of a diverse range of networking protocols, networking technologies and their interactions. In PT Anywhere, the user only needs to access the front-end via a web browser, thus making the application ready-to-use. PT Anywhere facilitates learning for anyone who wishes to experiment with network simulations at their own time and pace, both within informal and formal learning contexts.

What can PT Anywhere do and what context does it operate in?

PT Anywhere allows learners to emulate industrial experience by creating a cadre of curriculum-embedded labs and practical exercises, the quality of which is ensured via a rigorous production process (i.e., extensive modelling, mapping, and reproducing of the network infrastructure).

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PT Anywhere supports both formal and informal learners, and teachers to gain access to state-of-the-art, authentic, and world-leading network services.

PT Anywhere becomes a mediator, extending the experience beyond the tradition of a practical (physical) lab, offering a multitude of simulated scenarios through interactive e-books, where the learner may engage synchronously or asynchronously, in either local or global simulated networking activities.

A unique feature of PT Anywhere is the access to "real" facilities (i.e., real networks of actual companies/organisations rather than simulated/virtual labs).

PT Anywhere leverages the Open Educational Resources (OER) movement by developing interactive learning resources that are offered as self-study OER to learners and educators. Within these OER, learners use PT Anywhere in order to simulate different types of networks and understand how network technologies work and interact with each other.

One of the key features of PT Anywhere is the simplicity in the front-end design. PT Anywhere has been designed with the goals to: be multi-platform, interoperable, have a simple interface, be scalable and measure learning experience.

Server-side services: PT Anywhere in conjunction with Packet Tracer handles the access to the various networking technologies.

Client-side services: Learners and teachers can access PT Anywhere across the following modalities: the web, smartphones. The front-end of PT Anywhere has been developed using HTML5 and JavaScript

DESCRIPTION

Category (based upon Schutser & Glavas model (2017)): technology based

Students

The case can be described as a so-called technology-based following the categorisation of Schutser & Glavas (2017), and simulated internship following Bayerlein et al. (2017). The PT Anywhere application has been used in a range of settings and approaches. For example, in the Mikroyannidis et al. (2020) paper it was indicated that an application of PT Anywhere was used as an an online asynchronous session over a 24h period (diverse mix of Cisco Networking Academy tutors, students and alumni, both from the UK and abroad), involving two network simulation exercises. A follow-up questionnaire with 111 respondents (37%) indicated strong agreement especially regarding the ease of use of the offered learning content, the appropriateness of this content to their background, the quality of the content, as well as the clarity of the learning outcomes and structure of the OER. Additionally, the majority of respondents (63%) agreed that they would continue using PT Anywhere beyond the scope of this evaluation session. In other settings, EU students were given actual credit to participate in real courses and completed various activities using the PT Anywhere tool.

Teachers

Teachers were involved in the evaluation of PT Anywhere. Participants were recruited from the Cisco Networking Academy on a voluntary basis. Every participant was asked to register in advance via an online form. In total, 390 participants were registered before the evaluation session. These were a diverse mix of Cisco Networking Academy tutors, students and alumni, both from the UK and abroad. More details are available in Mikroyannidis et al. (2020).

Researchers

Researchers from KMI and CISCO were involved to develop the OER and PT Anywhere approach.

Decision-makers

n/a

CONCLUSION

PT Anywhere described above is categorised as technology-based, as the entire WBL experience is fully online and integrated. Learners can interact with OER materials and real-life network configurations and technologies from their web browser, and experiment with different configurations. The approach is interactive, self-paced and mostly focussed on self-directed student-centred learning. The approach has been adopted by six universities across Europe in different simulated lab contexts. In some settings the primary purpose of PT Anywhere is to give any formal/informal learner access to interactive learning opportunities with state-of-the-art network technologies. In other settings the approach was more embedded in the curriculum and was part of for-credit learning activities.

Preliminary evidence suggests that users found the use of PT Anywhere easy and useful. Whether these interactions in PT Anywhere helped to nurture specific graduate skills has not yet been determined. One main limitation of this approach is related to the actual physical requirements of the real facilities (for example, how the facilities are set up, or how many people can use it at the same time).

CONTACT

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ADDITIONAL INFORMATION

Mikroyannidis et al. (2020). PT Anywhere: a mobile environment for practical learning of network engineering. Interactive Learning Environments, 28(4), 482-496.

Mikroyannidis, A., Gomez-Goiri, A., Smith, A., & Domingue, J. (2017, April). Online experimentation and interactive learning resources for teaching network engineering. In 2017 IEEE Global Engineering Education Conference (EDUCON) (pp. 181-188). IEEE.

Mikroyannidis, A., Domingue, J., Pareit, D., Vanhie-Van Gerwen, J., Tranoris, C., Jourjon, G., & Marquez-Barja, J. M. (2016, April). Applying a methodology for the design, delivery and evaluation of learning resources for remote experimentation. In 2016 IEEE Global Engineering Education Conference (EDUCON) (pp. 448-454). IEEE

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2.1.5 Robotic Telescope (The Open University)

INTRODUCTION AND CONTEXT

The Robotic Telescope has been developed by the Open University (OpenSTEM Labs) since 2008 (Holmes et al., 2011; Kolb, Brodeur, Braithwaite, & Minocha, 2018). The Physics Innovation Robotic Telescope Explorer (PIRATE) has been developed to give OU physics and astronomy students access to a “hands-on” (real/online) experience of using an astronomical telescope. Originally it was implemented as sending students to Mallorca as part of their residential school experience became too expensive, whilst at the same time giving the accessibility challenged students the opportunity to gain these experiences from the comfort of their home/work. With the growth in numbers of students and technological affordances and functionalities of the Robotic Telescope increased over time, providing a fully online experience became increasingly more authentic. Using principles of project-based learning and WBL, students work on a project as a group to plan the investigation and observing session, collect and analyse data, and write-up the results.

In theory the data analysis part of the group project could be achieved with archival data alone. However, the centerpiece of the modules where the Robotic telescope is used is a series of online sessions where the students are remotely controlling the Remote Telescope in real-time to acquire their own data for later analysis (Kolb et al., 2018). The practical activity thus conveys the challenges of night-sky imaging (Kolb, 2014); it provides ownership of the process and hence a powerful motivation for learners. The typically four-hour long PIRATE observing sessions are shared between an observer team of four or five students. In this case-study we primarily focus on the experiences reported in a third year astrophysics module (S382).

This is an example of online experimentation/remote labs with students working in groups supported by one “night duty astronomer” (i.e., often a PhD student or an Associate Lecturer in OU jargon). During the scheduled night, using synchronous

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conference tools (e.g., Adobe Connect, Skype), an interactive web interface is used to control the Robotic Telescope in real-time. The combined experience offers a remote lab environment where astronomy students can experiment with a variety of settings and approaches of the robotic telescope based upon their respective research questions.

What can the Remote Telescope do and what context does it operate in?

Remote Telescope allows learners to gain real-time and authentic experiences in working with a real telescope at a distance. By creating a cadre of curriculum-embedded labs and practical exercises, the quality of which is ensured via a rigorous assessment, support and production process

Remote Telescope supports both formal and informal learners to gain access to state-of-the-art, authentic astronomy experiences

A unique feature of Remote Telescope is the access to real data and facilities (rather than simulated/virtual labs)

The Remote Telescope provides authenticity, sociability, and metafunctionality (i.e., includes features of online laboratories that would be difficult or impossible to implement in a traditional (i.e., on-site) scientific setting) (Brodeur, Minocha, Kolb, & Braithwaite, 2015)

This approach encourages communication, team working, practical task/problem solving (e.g., open ended, unpredictable weather), critical thinking, react to unforeseen circumstances, and working with complex data

It has been successfully used in a range of contexts and modules (e.g., SXPA288 Practical science: physics and astronomy, SXPS288 Remote experiments in physics and space, S382 Astrophysics, S818 Space Science) and the Badged Open Course Astronomy with an Online Telescope

During COVID-19 several astronomy courses from “traditional” universities (e.g., University of Edinburgh, University of Newcastle) were also using the Robotic Telescope.

DESCRIPTION

Category (based upon Schutser & Glavas model (2017)): technology based

Students

The case can be described as a so-called technology based following the categorisation of Schutser & Glavas (2017). The Remote Telescope application has been used in a range of settings and approaches. For example, in S382 students use the Virtual Learning Environment all the time, but specifically the Remote Telescope for at least three full nights/evenings. Furthermore, prior to the first observation they receive several hours of training to use the equipment. With the increased technological capabilities of the Robotic Telescope it is now possible to formally restrict observing sessions to about four hours per night; before 2017 many teams stayed up all night to work together on continuing their data acquisition. After completing their observing runs the students would still log into the system to access data for around five weeks, often once or twice a week. The output of the group project is a group report, in the style of a scientific paper, compiled in a wiki environment.

While overall most students enjoyed the learning experiences and this approach is well embedded into the qualification, not everyone is able to work in a group. A large scale study including 1140 students (Brodeur et al., 2015) found that most students found the use of the remote telescope to be authentic and sociable. A more recent study by Kolb et al. (2018) with 200 students suggested that older learners found the virtual labs more enjoyable than younger learners, who preferred “real” labs.

Teachers

A so-called night duty astronomer facilitates the group before they start to use the Remote Telescope. The group will receive a detailed briefing/introduction to “get them in the mood”, and afterwards the night duty astronomer leaves the group to

collect and analyse the data and get on with it. If needed additional support can be received during the session. There is a constant challenge to keep the facilities up to date. Furthermore, a weather change can interrupt an observation (like in real life), which could be a real disappointment for students.

Researchers

Researchers from the School of Physical Sciences and School of Computing & Communications within the Faculty of STEM are actively involved in designing, implementing and evaluating the Remote Telescope.

Decision-makers

As this required substantial investment to buy, install, maintain and update the Remote Telescope hardware and software, after the initial success of the pilot study as part of the piCETL initiative (Physics Innovation Centre for Excellence in Learning and Teaching) in 2008 this became an embedded case study of, initially, the OpenScience Laboratory, and now as the Astronomy wing of the Open STEM Labs where it is represented as the OpenScience Observatories. It is part of the Open Science approach to bring practical science to our distance learners and structurally embedded into the physics and astronomy & planetary science undergraduate qualifications, as well as the MSc in Space Science and Technology.

CONCLUSION

The Remote Telescope described above is categorised as technology based, as the entire WBL experience is fully online and integrated within several modules within physics & astronomy/STEM. Learners can interact with the Remote Telescope while working on authentic group projects, and have the opportunity to gather real data from real telescopes operated at a distance. The overall approach is very interactive, group-based and process-driving with students gaining relevant disciplinary and generic skills (i.e., communication, working in groups, working under time pressure), and is mostly focussed on student-centred learning. This approach has been adopted by other universities as well. There is substantial evidence gathered since 2008 that the Remote Telescope approach works for students.

CONTACT

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ADDITIONAL INFORMATION

Website HE institution blog: https://stem.open.ac.uk/study/openstem-labs/openscience-observatories

https://www.open.edu/openlearn/ocw/mod/oucontent/view.php?id=96046&section=_unit1.1.1

Brodeur, M., Minocha, S., Kolb, U., & Braithwaite, N. (2015). Designing online laboratories for optimal effectiveness: undergraduate priorities for authenticity, sociability and metafunctionality. Paper presented at the 15th International Conference on Technology, Policy and Innovation, The Open University, Milton Keynes. http://oro.open.ac.uk/45934/

Holmes, S., Kolb, U., Haswell, C. A., Burwitz, V., Lucas, R. J., Rodriguez, J., . . . Barker, J. (2011). PIRATE: A Remotely Operable Telescope Facility for Research and Education. Publications of the Astronomical Society of the Pacific, 123(908), 1177-1187. doi: 10.1086/662148

Jones, M. H.; Chyriwsky, S. M.; Croston, J.; Kolb, U.; Schwenzer, S. P. and Urquhart, S. (2020). Online team work in space science and astronomy at the Open University. In: Proceedings of the 3rd Symposium on Space Educational Activities, University of Leicester, Leicester, UK, pp. 126–127.

Kolb, U. (2014, December 01, 2014). The PIRATE Facility: at the crossroads of research and teaching. Paper presented at the Revista Mexicana de Astronomıa y Astrofısica.

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Kolb, U., Brodeur, M., Braithwaite, N., & Minocha, S. (2018). A robotic telescope for university-level distance teaching. Paper presented at the Proceeding of the Robotic Telescopes, Student Research, and Education Conference, San Diego, California. https://rtsre.org/index.php/rtsre/article/view/33/34

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2.1.6 Virtual Exchange (Global, The Open University)

INTRODUCTION AND CONTEXT

Virtual exchange (VE) is an approach for language learning, pre-service teachers, and other disciplines to work and learn together at a distance. VE provides an opportunity to make a connection between learners in different geographical locations in a structured interaction and collaboration. VE, therefore, is considered as a type of education programme enabling the use of technology to allow remote learners to interact and work together. VE has increased its popularity in university education, including language teacher education programmes. Collaborating online with colleagues and students from different cultural backgrounds and educational systems has allowed trainees to experience and reflect on issues related to technology and pedagogy in authentic linguistic and intercultural contexts.

In that sense, the Evaluating and Upscaling Telecollaborative Teacher Education (EVALUATE) project (Hauck et al., 2020; Lewis et al., 2021; Rienties et al., 2021) collected and analysed data from VEs across the curriculum involving over 1,000 participants at language teacher education institutions. The project demonstrated the urgent need for teacher education that combines technology and pedagogy and argued for VE as an ideal context to this effect. There exists a potential of critical digital literacy development through VE (Hauck, 2019) for the relevance of critical digital literacy concerning the characteristics of the twenty-first-century graduate, and the potential of the VE to develop skills to this effect in language teachers and subsequently their students.

VE includes experiential modelling or creative modelling, where teachers in their training get an opportunity to trial the tools and the processes that they are expected to implement in their teaching practice later. It is called experiential modelling because the teacher experiences from the students' point of view. VE has, therefore, several characteristics:

- VE is innovative. It comes out of language learning and there is an EU wide infrastructure available for it. It is now something that is done across the curriculum in all subject areas, and particularly innovative across curricular exchanges where teacher trainers and teacher trainees from very different subject areas come together and do project work. In this space a genuinely new curriculum in terms of subject matter is created.
- VE is inclusive but inclusivity is not a given, it has challenges. Only a limited population of the world has access to the technology that makes VE work, including Internet bandwidth and powerful devices. Another aspect is the knowledge that is made relevant in VE and the terms under which the exchanges take place, are in fact, influenced by many different factors including the teaching partners, academic positions, linguistic competence, the linguistic competence of the student and institutional constraints (i.e., lack of support, socio-political issues, geopolitical issues, gender, race, and age issues).

DESCRIPTION

Category (based upon Schutser & Glavas model (2017): technology based

Students

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As reported following Schutser & Glavas (2017) VE is considered to be technology-based where the majority of the work happens in asynchronous mode. Participants work on the asynchronous mode as individuals or small groups and then the synchronous gatherings where participants use the knowledge and the insights gained and think about how to move forwards the next steps within the VE.

A VE project usually lasts between five and six weeks, between two teachers and their student cohorts, including weekly 75-90 minutes synchronous sessions and the rest happens in the asynchronous mode which means between five to six hours a week roughly on average. VE to be inclusive needs to consider the minimum common denominator among participants (i.e., the access issues for participants, and what works for everybody) determines how teaching and learning happens. Various reports indicate that students in general are positive about the learning experience, and have further developed their technological, pedagogical, and intercultural skills when participating in these VEs.

Teachers

At the Open University VE is pilar for its internationalisation strategy and an Equality, Diversity and Inclusion (EDI) initiative in the learning and teaching of languages and cultures and across the curriculum. VE experiences are used in the teaching of language in the context of the alternative learning experience. For students who go for a week abroad to Spain, Germany or France in the second year of their studies. Because of the pandemic, the OU has linked up French students with teacher trainees studying French as a foreign language, who want to become French language teachers. They were the assistants in the VE. Students get credits for their studies from this VE experience.

Researchers and decision-makers

VE can be applied in all subject areas, and now increasingly, administrators, researchers, and decision-makers. Bespoke training packages for administrators and educational decision-makers can be created.

CONCLUSION

VE is technology-based, the COVID-19 pandemic has catapulted VE to the central stage of the educational landscape, because of the lack of physical mobility for learners. VE offers opportunities for teachers and students to come together and work together across time zones in geographical distance. Teachers experience that in their training they come together with other teacher trainees and they engage in a VE project. Once teachers understand the importance of this approach they usually become an advocate of this approach in their educational institutions. VE is very much bottom-up and can also reach the administrative staff. EVALUATE worked on how to get VE systematically integrated into university curricula.

VE is challenging but can impact the curricula development, one example is the OU context, because of the pandemic it was not possible to send students abroad but, in the future, it is important to consider climate change and the carbon footprint to avoid unnecessary travelling. At least the VE provided by the OU prepares language students to be more prepared for an international experience.

CONTACT

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ADDITIONAL INFORMATION

Projects:

EVALUATE: https://sites.google.com/unileon.es/evaluate2019/evaluate?authuser=0

EVOLVE: https://evolve-erasmus.eu/

Hauck, M. (2019). Virtual exchange for (critical) digital literacy skills development. European Journal of Language Policy, 11(2), 187-210.

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Hauck, M., Müller-Hartmann, A., Rienties, B., & Rogaten, J. (2020). Approaches to researching digital-pedagogical competence development in VE-based teacher education. Journal of Virtual Exchange, 3(SI), 5-35. http://oro.open.ac.uk/70170/

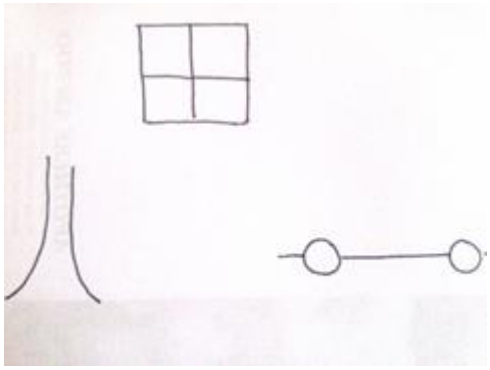
Lewis, T., Rienties, B., Rets, I. (2021). Communication, Metacommunication and Intercultural Effectiveness in Virtual Exchange: The EVALUATE Project. Intercultural Exchanges in Education. Anthippi Potolia and Martine Derivry (Eds). Routledge.

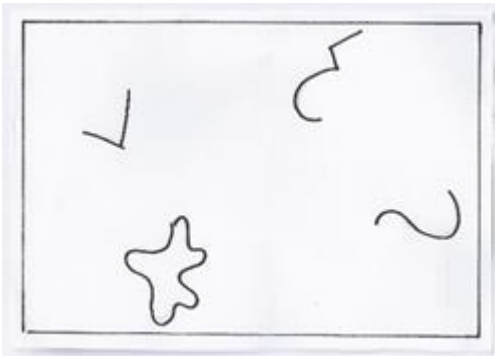
Rets, I., Rienties, B., Lewis, T. (2021). Transforming pre-service teacher education through Virtual Exchange: a mixed-method analysis of perceived TPACK development. Interactive Learning Environment. DOI: 10.1080/10494820.2020.1826983.

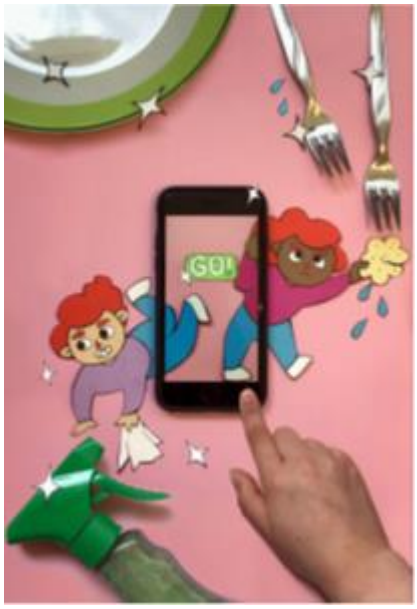
Rienties, B., Lewis, T., O'Dowd, R., Rets, I., Rogaten, J. (2021). The impact of Virtual Exchange on TPACK and foreign language competence: reviewing a large-scale implementation across 23 Virtual Exchanges. Computer Assisted Language Learning.

2.2. Case-studies of blended/online flipped classroom

2.2.1 Art education seminars (Goethe University)







INTRODUCTION AND CONTEXT

A flipped classroom (FC) concept was developed for art education seminars at Goethe University Frankfurt. The first development took place in the winter semester 2015/16 as part of a grant from the university for the seminar "Diagnose und Förderung: Development of aesthetic behavior in children and adolescents." The concept was further developed from a FC concept with alternation of weekly presence and online phases to a purely online seminar concept. The goal is to strengthen the independent, active and communicative examination of the students of the subject art with central contents of the study subject in the area of subject pedagogy. The independent work is to be applied by the students of the teaching profession later in their own teaching, so that the principle should already be learned at the university as a meaningful approach.

The seminar in winter semester 2015/16 was divided into three phases:

1st phase: In the first meetings of the seminar, students were introduced to the FC method. The students familiarised themselves with both the technology Virtual Learning Environment(VLE: OLAT) and the sometimes rather unfamiliar preparatory work behavior. This was done by providing short texts and illustrations on paper at the beginning of the course, which were then to be read in about 30 minutes and - based on one or two "preparatory questions" in the VLE - discussed in partner work or in small groups. The answers were then entered in the VLE and viewed and discussed together in the seminar.

2nd phase: In the core phase of the seminar, the preparation and answering of preparatory questions on texts, images, videos actually took place before the face to face seminar via the VLE. The results were then presented and discussed at the face-to-face meeting. Those students who had not prepared themselves, however, were partly disoriented in the course itself, as they lacked the basic knowledge discussed during the FC. Such an experience was accepted by the seminar leadership and should lead to the fact that the preparation of the then following course would take place more intensively by all.

3rd phase: In an experimental phase at the end of the seminar, further and extended as well as "creative" possibilities of the FC principle were introduced and tried out. For example, videos were watched at home for preparation, which were then turned into a creativity impulse by the students, or texts were read based for which the photos were to be taken. Results of the preparation were then viewed and discussed in the seminar.

For additional motivation, students were awarded points if they submitted the tasks in the VLE beforehand. For students with many points, the chance of winning a book in the subsequent raffle increased, so that incentives came into play at various levels.

With the evolution of the seminar concept to a purely asynchronous online scenario today under pandemic conditions, the incentives for participation and the incentive to stay in the timed rhythm of the seminar are primarily to receive feedback from the instructor and other students. Students complete assignments today and upload results to the VLE. Other students and the instructor comment on and discuss submissions so that a culture of learning from each other can emerge. Giving

feedback to fellow students is an important and obligatory part of the concept. Assignments are worked on as a group and as a range of individual tasks. The asynchronous scenario provides a high degree of temporal flexibility for learners and teachers. This does not mean that the teacher does not care about the students, but it relaxes the teaching situation in terms of time (no power over time and time periods, but self-determined time allocation).

Which competencies are promoted in particular?

Communication, autonomy, application of knowledge (develop teaching competence/ action competence - design exercises that promote creativity, apply image reception methods).

The concept is designed for a group size of 25 to 35 students.

DESCRIPTION

Flipped classroom Category

FC1: The role of the teacher is to guide the learning process and give feedback. It is not to exercise control and sanctions. Within a clear course structure, freedom in terms of time and content is granted as far as possible. This allows students to proceed according to their own interests. In doing so, the competencies aimed at within the seminar are promoted.

FC2: Active, self-directed acting in content, social, spatial and technological environment

FC3: High level of interaction social and with content

FC4: High level of multimedia with many different media (i.e., video, pictures, sketches, drawings, texts)

FC5: High degree of individualisation of learning processes, especially in terms of content, depending on interest and learning duration.

FC6: Students get input (e.g. video, text) with tasks, exercises and small projects to prepare at home and upload results to the VLE. Results are presented, they get feedback from peers and the teacher) and the results are discussed in online forums.

FC7: Over the last few years, the FC concept has been practiced in various forms at Goethe-University.

Students

Students work self-directed in individual work and in groups on various tasks and small projects and make results available via a learning platform. The results can be viewed by all participants. They perform peer review in the form of feedback and discuss the results in forums. Group work is self-organised, i.e. students coordinate their time within a given framework and also organise the choice of the communication channel form (e.g., via Discord, soom, WhatsApp) themselves. Students also exchange information synchronously via video calls (Discord, Zoom, etc.) and work on tasks in groups. Student evaluations show very positive feedback on the concept of independent preparation and development of content with subsequent exchange and feedback on the results. The degree of freedom in terms of time and content leads to high motivation. The attitude of allowing freedom in terms of time and content is something that the students want to adopt later in their own teaching. In addition, students emphasised that the possibility of viewing the submissions of other students was motivating and that ideas could be adopted for their own work.

Teachers

Teachers determine the structure of the course through assignments, materials and timing (deadlines). This allows for a great deal of flexibility in terms of content and time. He initiates mutual feedback and gives detailed feedback on the students' submissions.

Decision-makers

The development of the FC concept was initially supported by Goethe University.

CONCLUSION

In the concept described the development of content takes place "flipped", i.e. students receive content in the form of texts, videos, images, etc. and work on tasks and small projects that are uploaded via a learning platform, presented to all learners. Students give each other feedback on their work and discuss content-related aspects of the work results via forums. Participation in discussions and feedback to fellow students is a mandatory part of the concept. In the case of group work, students organise themselves (choice of communication media, time arrangements). In addition, students receive detailed written feedback on results from the instructor.

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The results of the course evaluation show very positive feedback of the students to the concept. Very high approval is given to the aspects of structuring, feedback, independent and active engagement with the content and constructive, positive class climate.

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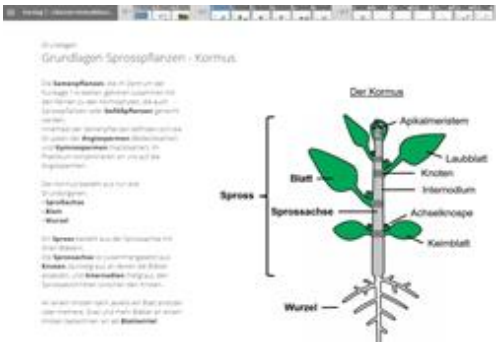
2.2.2 Botany-Internship (Goethe University)



Please give me a short feedback on the preparation for course day 2:
What did you not yet understand well when working through the preparation material, what would you have liked to have explained in more detail?

If you do not have any questions, please briefly explain one aspect of the material that you found particularly interesting.

INTRODUCTION AND CONTEXT

A flipped classroom (FC) concept was developed for a botanical internship at Goethe University Frankfurt with the aim of ensuring better preparation for the students and gaining more time in the internship for the practical work exercises with the plants. Prior to the switch to a FC scenario, it was common for the course instructor to outline the theoretical background and briefly discuss the objects and preparation in an introduction of about 20 to 30 minutes at the beginning of the weekly practical. The students describe and identify the plants and make drawings in the course, through which they should memorise the structure and typical characteristics of the plants (families) or fungi. In order to dispense with the theoretical introduction in the practical course, it was necessary to ensure that the students prepared themselves. For this purpose, Web Based Trainings were developed as the self-learning materials with high-resolution illustrations, explanatory texts, automated evaluable self-tests and a feedback possibility for students to the lecturer. It was made available to the students via a learning platform.

The automated evaluation of the self-tests provides teachers with an overview of the students' learning status. Via the feedback tool, students can name problems and difficulties before the start of the course, which they would like to address again in the onsite lectures.presence time. These aspects were then taken up and explained in presence or supplementary learning material was handed out. The online preparation was an obligatory study performance for the students. It was made clear that students who were not prepared could be sent home on the day of the course. It was also emphasised that it does not matter how well the assignments were solved and that the results are not relevant to grades.

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Which competencies are promoted in particular?

Self-regulation and self-direction of learning, application of knowledge.

The concept is designed for a group size of 25 to 40 students.

DESCRIPTION

Flipped classroom Category

FC1: Knowledge transfer and advising the learning process

FC2: Receiving knowledge, self-directed preparation and then application of knowledge in the course

FC3: High level of interaction with content and social interaction in the course

FC4: Medium to high level of multimedia with different media (i.e.pictures, sketches, drawings, texts, tests)

FC5: High degree of individualisation of learning processes especially in terms of time, in the preparation of content.

FC6: FC focused on exercises: Students get a WBT with tests and the possibility to ask questions and during the class, the teacher proposes exercises where the knowledge is applied

FC7: Over the last few years, the FC concept has been practiced in various forms at Goethe University.

Students

FC2: Receiving knowledge, self-directed preparation and then application of knowledge in the course

FC5: High degree of individualisation of learning processes especially in terms of time, in the preparation of content.

Students complete self-directed online learning units with tests to prepare for the course. In addition, they ask questions via a feedback form before the start of the course, report any difficulties they encountered and name aspects they found particularly interesting. In the course, they apply the knowledge within exercises on plant identification and description.

Teachers

FC1: Knowledge transfer and advising the learning process

The instructor provides the online learning units and sets deadlines for completing the course preparation tasks. At the beginning, the principle of the FC was explained and rules regarding preparation were addressed. It was clearly communicated that working on the assignments by the deadline is a prerequisite for admission to the internship, so that the instructors can orient themselves to the learning status and questions of the students. It was also emphasised that it does not matter how well the assignments were solved and that the results are not relevant to grades. Via the learning platform, the teacher gets an overview of the students' activity before the course starts. It becomes apparent whether the students are active and also how well they did on the tests. In order to specifically prepare the course day as a teacher, it was sufficient to randomly read the free text answers and analyse the difficulties with the tasks.

Decision-makers

The FC concept was developed and evaluated in the context of a university didactic training at Goethe University.

CONCLUSION

With the FC approach, it was possible to achieve the primary goals of the conversion of the course prebriefing, to ensure (at least basic) preparation of the students and to gain more internship time. This also justifies the considerable effort involved in creating the learning content in the form of WBTs. However, since these are continuously updated, adapted and reused, the effort is comparable to any other course that is designed for the first time.

Results of the evaluation show very positive student feedback on the concept. When asked to rate the inverted model, three-quarters of students said they learned more than in the traditional format. Two-thirds preferred the inverted model and would like to see more courses of this type. In addition, the impact of the change in teaching scenario on students' learning behavior was investigated. For this purpose, an experimental and control group was formed and the inventory on general learning strategies by Schiefele & Wild (1994) was used. In contrast to the control group, the experimental group, which learned according to the inverted classroom concept, assessed their learning strategies significantly better after the end of the course than before the beginning of the course (cf. Sommer 2018).

Co-funded by the Erasmus+ Programme of the European Union

Schiefele, U.; Wild, K. P. (1994): Lernstrategien im Studium: Ergebnisse zur Faktorenstruktur und Reliabilität eines neuen Fragebogens. In: Zeitschrift für Differentielle und Diagnostische Psychologie, 15 (4. Jg.), S. 185-200.

Sommer, J. (2018): Bessere Kursvorbereitung durch das Inverted-Classroom-Konzept. In: *Neues Handbuch Hochschullehre.* [Teil] D. Medieneinsatz. 3. Netzbasiertes Lehren und Lernen.Berlin:DUZ Verlags- und Medienhaus (2018) D 3.35, S. 13-28

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Frankfurt am Main

Sommer@starkerstart.uni-frankfurt.de

ADDITIONAL INFORMATION

Sommer, J. (2018): Bessere Kursvorbereitung durch das Inverted-Classroom-Konzept. In: *Neues Handbuch Hochschullehre.* [Teil] D. Medieneinsatz. 3. Netzbasiertes Lehren und Lernen.Berlin:DUZ Verlags- und Medienhaus (2018) D 3.35, S. 13-28

http://lernbar.uni-frankfurt.de/courses/958/3081/index.html?id=0e804cbe284964e5831b267976b3338bc746a8

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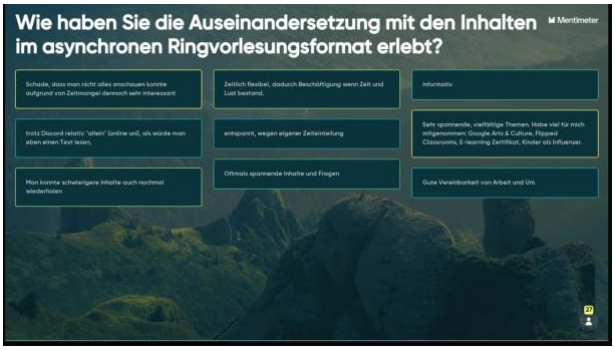
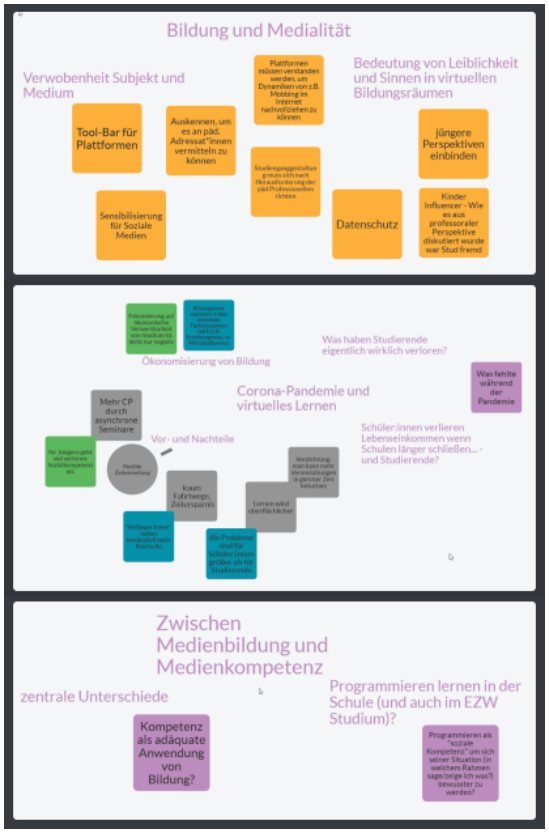
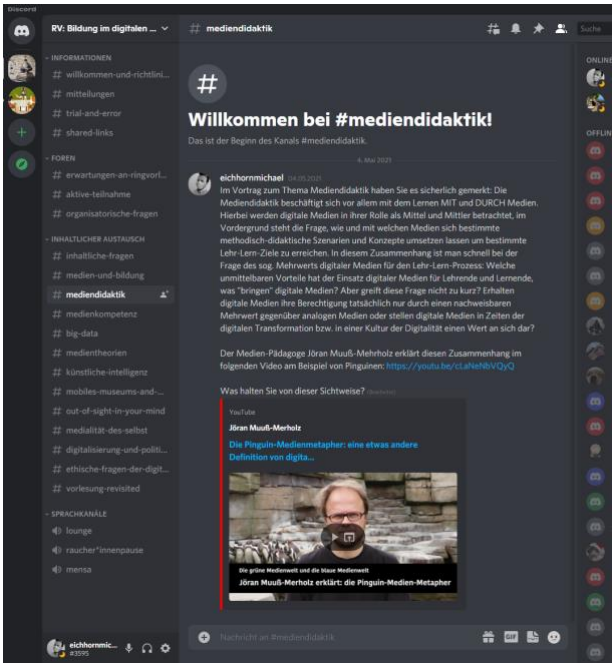
2.2.3 Education in the Digital Age lecture series (Goethe University)







INTRODUCTION AND CONTEXT

Digitisation and informatisation are leading to societal change with diverse and revolutionary consequences for educational theory and practice. The course is therefore dedicated to various key topics in the field of digitisation and education and is intended to provide Bachelor's students in the Educational Sciences program in particular with the broadest possible insight into the subject. In the past semesters, this was realised through the format of a classical on-campus/on-site lecture series in presence: different lecturers gave an overview from different perspectives. This format was further developed into a flipped classroom (FC) scenario in the wake of COVID-19 and the associated distance learning. In the following, we describe the concept as it was implemented in the summer semester 2020 with about 120 students. The course consisted of asynchronous and synchronous phases and was conducted entirely online.

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On the one hand, the focus was on the topics of the individual lectures, which were discussed in suitable digital formats. On the other hand, the use of digital media and the pedagogical design of the event were also the subject of reflection in order to explore what digital university teaching, digital university and digital lectures could look like and to receive suggestions from the student body. It was advantageous here that the responsible teachers also deal with precisely these topics in their research.

Structure of the course

The lecture series is divided into three blocks, most of which will be worked on asynchronously by self-study. The contents are made available via the VLE OLAT:

Block 1 consists of three compulsory modules "Media and Education", "Media Didactics" and "Media Competence". Each module contains a lecture as video recording as well as further materials (script, slides, further literature). For the asynchronous lecture parts, different media and technological approaches were tried out; the choice of media was left up to the lecturers in the lecture series:

- Animated explanatory videos: very time-consuming to create, but often only "explain" an issue through (strong) simplification, which is often not goal-oriented in university teaching
- Podcasts: Were very well received by students;, this format obviously has a lot of potential for university teaching (different mode of reception)
- Screencasts: either as a classic lecture or also without a speaker image, especially lectures in unusual locations were positively received by the students.

In the asynchronous self-study phases, students work through the content of their individual modules and make notes for themselves on the relevant content. The notes are submitted as proof of active participation via the VLE.

Block 2 consists of an elective part and contains related and advanced topics such as "Big Data", "Artificial Intelligence" or "Ethical Issues of Digitalisation". The students also had to select and work on three modules from the compulsory elective part. The individual modules were structured in the same way as in block 1. Here, too, the students were required to work through the content independently, prepare notes and submit them via the VLE.

Block 3 was also the final exam of the course. For this purpose, the students were required to write an essay. In it, they reflect on their experiences from the lecture series and describe how they themselves would design such an event. In doing so, they justify their pedagogical decisions and attitudes towards the digital, asynchronous lecture format and explore the question of the extent to which the digital and asynchronous format of the lecture series brings students closer to the content taught and the extent to which it fulfills the goal and purpose of the course - or not.

Connecting the asynchronous blocks 1-3 are 3 synchronous video sessions. These are held via Zoom. Participation in these sessions was voluntary for students. The particular challenge for the synchronous phases was to adequately support higher taxonomy levels in a FC scenario, including in particular discussion processes among students and between students and instructors. In the webinars via Zoom, students discuss in small groups the content they have developed as well as the formats and media used. The focus was on exchange, but less on the content of the individual lectures than on more general, generic insights - in a sense, the application of the content from the lectures.

A Discord server was used as a further means of communication throughout the event. Discord is a chat tool for communication and discussion and is organised through different channels, similar to Slack or Mattermost. On Discord, students could anonymously and continuously discuss the contents of the individual modules, which were viewed by the students at different times. Furthermore, further links and net findings could be exchanged and students could also ask organisational questions. Discord was quite well received by the students, but the loose, informal form of chat communication was also criticised by some students.

The whole scenario was thus to a large extent asynchronous, there were only a few fixed points with the synchronous sessions, which was also criticised by the students. The use of Discord was intended to compensate for this to some extent, as a permanently open channel over which both synchronous (quasi-real-time chat) and asynchronous (channels as forum threads) communication is possible. Nevertheless, students would have liked to see even more synchronous video meetings.

Which competencies are particularly promoted?

The acquisition of interdisciplinary competencies was not so much in the focus of the conception of the FC scenario, since the concept rather arose from the situation of COVID-19and was based on an originally classic onsite lecture series in the lecture

hall. In retrospect, it is nevertheless possible to name competencies that were acquired, even if this was not intended during the planning phase:

- Self-organisation / self-control of one's own learning process or one's own studies, interest-led studying (selection of contents, learning times/locations, keeping up, etc.).
- Media use, also differentiation from other media offers; separation of study and private use
- Digital communication (discussing and arguing with the help of digital media).

DESCRIPTION

Characteristic features of the learning scenario

- FC with focus on group activities: Different groups with different content questions were formed for the synchronous sessions. Students could assign themselves to a group and change groups at any time. Heterogeneous groups were formed purely according to content preference. In-depth discussions took place in the groups, which were documented using Flinga boards. The central results were then presented in the plenum.
- Self-study (mobile learning, self-assessment) was strongly emphasised (especially in the asynchronous phases), students were spatially and temporally flexible, mobile learning was feasible.
- Personalisation was more likely to be done by the students themselves (through individual selection of content and design of the learning path / learning process), but was not technically supported by the teaching-learning scenario;
- The scenario therefore corresponded more to an open educational practice, also through the use of tools outside the closed VLE (such as Discord), but no targeted use of e.g. OER in the individual modules
- Interaction tended to be in the form of discussion, which was highly valued (synchronous as well as asynchronous), collaborative elements only very sporadically in the synchronous sessions (e.g., collection of discussion points on Flinga board)

Flipped Classroom Categories

Students

Although the role of the students is focused on the reception and preservation of knowledge, they are encouraged by the format to do so in a largely active and self-directed manner. Thus, students are able to make their own selection of content to some extent and take responsibility for the temporal (and spatial) organisation of their learning process.

Individualisation: Very high degree of individualisation possible, students were very free in the choice of content, media, learning duration and also the learning path, even the temporally and spatially/medially synchronised parts were not mandatory and could also be viewed afterwards as a recording.

Teachers

Especially in the asynchronous parts, teachers tend to be knowledge brokers (in essence, the scenario remains a lecture). In the synchronous sessions, the instructors provide advice and support the learning process, and they also act as discussion partners on Discord.

Decision-makers

N/a

FC1 Role of teachers: Especially in the asynchronous parts, teachers tend to be knowledge brokers (in essence, the scenario remains a lecture). In the synchronous sessions, the instructors provide advice and support the learning process, and they also act as discussion partners on Discord.

FC2 Role of learners: Although the role of the students is focused on the reception and preservation of knowledge, they are encouraged by the format to do so in a largely active and self-directed manner. Thus, students are able to make their own selection of content to some extent and take responsibility for the temporal (and spatial) organisation of their learning process.

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FC3 Degree of interaction: In the asynchronous phases, the degree of interaction with the content as well as the technological environment is very high. The degree of social interaction (medium) is significantly lower. In the synchronous phases, the social interaction as well as the interaction with the technological environment is very high. In contrast, interaction with the content is rather low. Interaction with the spatial environment is not possible due to the online-only scenario.

FC4 Level of multimedia: The scenario had a deliberately very high level of multimedia. The use of diverse media was also intended to achieve a pedagogical fit with the content (digital media in education).

FC5 Individualisation: Very high degree of individualisation possible, students were very free in the choice of content, media, learning duration and also the learning path, even the temporally and spatially/medially synchronised parts were not mandatory and could also be viewed afterwards as a recording.

CONCLUSION

Both the results of the course evaluation, the quality of the essays and the feedback from the students show that the concept worked and the intended learning objectives of the course were achieved. Some ideas for further development in the coming semesters are:

- Formulate discussion rules; address Discord as a discussion channel at the beginning of the course (How do we want to work with the platform?).
- Increase the synchronous part, more webinars with discussion, e.g. as a voluntary offer a weekly synchronous session for each of the inputs - the very high degree of freedom would be somewhat lost with a stronger clocking (students would be more prescribed which content to work on in which order), but the discussions in the synchronous sessions would go thematically deeper (not only on the meta level, but closer to the concrete content of an input).

The scenario described here can be replicated in principle; lecture series in other disciplines could also be conducted according to this format, as could other interdisciplinary formats in which different instructors lecture. Furthermore, but classical lectures could also follow this pattern.

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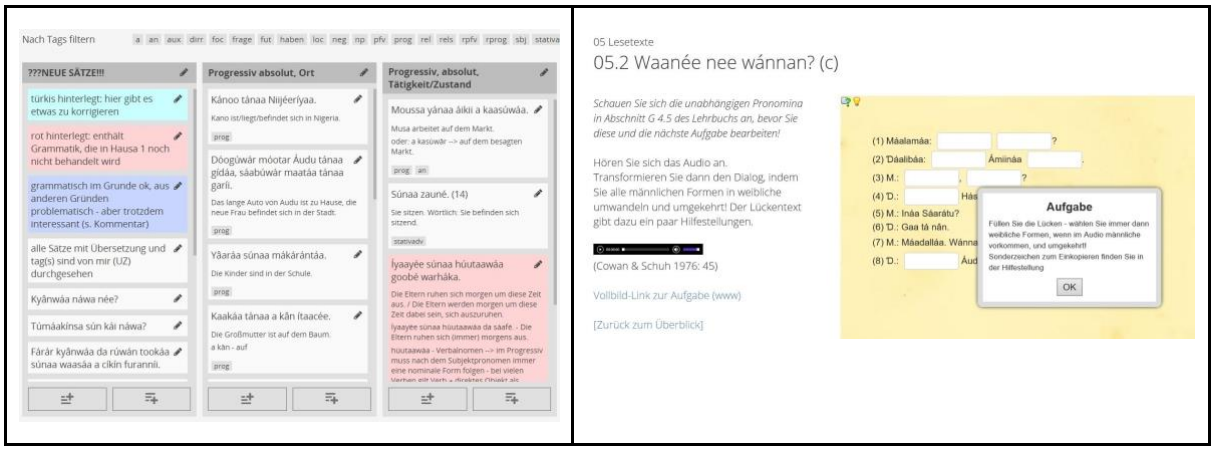
2.2.4 Flipped Classrooms at the Institute of African Studies (Goethe University)



INTRODUCTION AND CONTEXT

Subject of the courses

Language courses mostly for linguists, an introductory lecture and courses on key qualifications for first-year students.

Motivation

Enjoyment of teaching and active exchange with students. The lecturer was inspired to use the flipped classroom (FC) format in a further training course by Prof. Dr. Christian Spannagel (PH Heidelberg). Her central concern is to be able to prepare and design the synchronous classroom situation in such a way that an active professional exchange between teacher and students and students among themselves is possible.

The teaching material was available in a "conventional" form that had been tested over the course of several semesters, and was then revised in the first COVID-19 semesters to suit the FC format This was applied to the following course formats.

Course formats

Lecture

Fundamentals of morphology in the context of empirical linguistics. This is a lecture with tutorials. It is aimed at students in the third semester of the Bachelor's programme. The number of participants here is between 40 and 50 students.

Seminars

On various linguistic topics at both Bachelor's and Master's level. The group size is between 5 and 10 students.

Methodology

The asynchronous self-study phases were used to impart knowledge with the help of video recordings as well as interactive tasks for self-examination. In addition, there were open tasks and thinking tasks on in-depth topics.

In the synchronous face-to-face session, questions and results were discussed. This took place in group tasks with random composition or plenary.

Use of media

For the knowledge transfer in the asynchronous phases, short lecture videos based on existing presentations were used.

For the collection of the results from the open tasks as well as the results from the work in the face-to-face lessons, etherpads were mainly used.

Furthermore, padlet boards were used or kanban boards for the unfolding of word fields by the students in group tasks. In particular, this was done in order to overcome the reticence of the students through anonymity of the input.

LearningApps were used to design the interactive tasks and integrated on the learning platform. The development of such tasks was also transferred to advanced students as assignments in language classes.

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Learning outcomes

With the small learning groups, especially in the language courses, learning was much better distributed over the semester. The preparation for exams was much improved and the tasks in the exams were worked on with very well-founded answers.

With the large learning groups from the lecture, many students got involved in the FC scenario. The number of very good exams has not decreased here. However, the failure rate increased, but this could be due to the fact that some students had taken the (digital) exam rather on a trial basis.

Advantages, gains and effort

Students engage more intensively with the topics after a certain period of acclimatisation, during which they also have to be forced a little. It was also observed that working together in groups was unexpectedly easy and positively evaluated.

During the lecture, the students reported back that they perceived that they had to spend considerably more time than they used to in the classroom lecture. The lecturer sees various reasons for this.

- The asynchronous availability of the learning materials and the assignments makes it possible to work on the material for longer.
- The open in-depth assignments were only introduced in the last third of the course, so that the students needed some time to get used to this way of working.
- The lecturer's desire for a comprehensive presentation of a subject matter probably led to the students' workload being underestimated.

In these last two points, the lecturer envisages adjustments and improvements to her FC scenarios. For example, the independent open tasks should be used earlier in the semester.

On the part of the lecturer, a lot of the work was in converting the existing materials to video sequences and developing suitable assignments. What helped her here was to put aside the demand for perfection and to have the courage to leave gaps.

However, the lecturer does not see FC as a panacea. Rather, this approach must fit the teaching style and teaching interests of the teacher. In addition, there needs to be a keen awareness that even in this case there can be and are learners who do not necessarily learn better with this method.

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Co-funded by the
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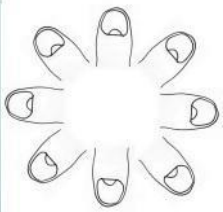
2.2.5 Open Design Studio (The Open University)



INTRODUCTION AND CONTEXT

The Open Design Studio (ODS) has been developed by the Open University (Jones, Lotz, & Holden, 2020; Lotz, Jones, & Holden, 2019). ODS is an online studio tool where students can upload and share their design work with peers and tutors in a module. ODS is a shared learning and practice space, whereby there is a focus on activity and tangible outputs that are short and "fun". The essential design premise is that design can only be learned through the experience of designing (Lloyd & Jones, 2013). Basically the main function of ODS is a communication and sharing of digital artefacts run by students in a visual way, like Pinterest.

The core of the Design and Innovation qualification comprises three design modules, one at every stage of study, and each equivalent to half a traditional UK university year (60 CAT points). Central to OU design teaching is the use of design methods and thinking to allow students the opportunity to learn from the experience of, and reflection on, design projects. ODS is used in three modules within this qualification (i.e., U101: Design Thinking; T217: Design Essentials, and T317: Innovation: Designing for Change). In this case-study we will primarily focus on the lessons-learned from U101, as this is the largest and longest running module using ODS.

In its first application in 2004, ODS was developed similar to Flickr (Lotz et al., 2019) where students could share and comment on each others' photographs in a safe and closed space. In 2010, the ODS model was updated to include more active and social learning aligned with design studio spaces, whereby providing opportunities for students to comment on each others' work (Lloyd, 2013; Lloyd & Jones, 2013; Lotz et al., 2019). After various design and technical iterations ODS was eventually integrated in the OU's VLE (i.e. Moodle), with further focus on high levels of student engagement.

ODS is an example of a FC. In ODS students can design, create and develop their own ways to work on 34 tasks in U101. Working in small groups of 20 supported by an online tutor (Associate Lecturer in OU jargon), learners can develop, design, create and critique their work in ODS in one (or multiple) of the four spaces. While there is assimilative module content

(around 33%), most of the learning design is specifically student-centred and the learners are expected to take control of the ODS.

What can Open Design Studio do and what context does it operate in?

- In a FC manner ODS allows learners to create and design their own artefacts and share these with their peers and teachers
- ODS is divided into four virtual spaces (Module, Group, Studio Work and Pinboard), each a spatial analogy to a proximate studio. Firstly, there are two 'semi-public' spaces, analogous to studio pinup or presentation spaces: My Module shows work for the entire module; My Group, shows only the work of peers in the same tutor group. Secondly, there are two 'semi-private' spaces, analogous to a student's personal work area: My Studio Work, in which students place specific design work; and My Pinboard, where students can place anything they wish.
- A unique feature of ODS is the longitudinal learning design philosophy, whereby the design and implementation have been further fine-tuned continuously in the last 10 years.
- It works across a range of levels (from level 1 to level 3 undergraduates) and works well at scale (up to 600-800 students per cohort) in three large modules. In U101 the tasks are well scaffolded and relatively small, but in later modules even more autonomy to experiment and design is given.

DESCRIPTION

Flipped classroom Category (based upon Model Andreas)

FC1: The role of the teacher is to advise the learning process.

FC2: Active, self-directed acting in content, social, spatial and technological environment

FC3: High level of interaction

FC4: High level of multimedia with many different/multimodel media (i.e., audio, video, visual artefacts, interactive)

FC5: Medium to high degree of individualization of learning processes, although there is some room for supporting diverse needs of learners with different learning/accessibility needs.

FC6: Blended of all four FC models (i.e, exercises, group activities, laboratory practical assignments, participation of students). "It is properly flipping the underlying structure of the course".

FC7 The OU has always done some form of FCs in their design philosophy, although it seems that some courses have moved back to didactical approaches. This ODS is probably one of the most flipped courses in the OU.

Students

Students are active, self-directed acting participants who design creative artefacts and outputs, and comment and critique their peers' work. In U101 in the six implementations reported by Jones et al. (2020) the 1922 students each posted on average 24.66 studio slots, viewed 230.70 slots, commented on 10.66 slots, asked for 32.24 feedback requests and provided 3.68 pinboard slots. In other words, ODS was very actively used by most students. Follow-up student evaluation studies indicated that 86% of students found ODS useful for their studies (Lotz et al., 2019). Follow-up correlation analysis of engagement in ODS and module success showed positive relations, with the strongest viewing other students' work (Jones et al., 2020). This showed that students were strongly motivated to look at work from their peers, which supported study success.

Teachers

Associate Lecturers play an important role in ODS and maintaining the design philosophy, which is based upon socio-constructivist, experiential learning (Jones, 2014), and design education. They primarily have an advising role in the learning process and encouraging interaction between learners.

Researchers

A range of teachers/researchers from the School of Engineering and Innovation have been involved over the years to fine-tune and adjust the design of ODS over the years using a range of research approaches and methods.

Decision-makers

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Over the years ODS has received substantial financial and structural support from the Faculty of STEM and OU to continue to build on the initial design success.

CONCLUSION

Open Design studies as described above is categorised as a FC that is fully flipped, as the entire learning experience is fully online and "run" by students contributing creative artefacts and output. Learners can interact with each other via ODS and VLE and actively view, comment, and critique their work. The approach is socio-constructive, experiential, and design-focussed and nearly entirely focused on student-centred learning. The approach has been adopted across three modules and has become part of a Design and Innovation qualification.

There is strong evidence that this flipped approach leads to engaged learners who provide a lot of interactions and outputs, and most students are positive about the learning experience. The assessments indicate that students over time are able to develop student competences like creativity, tackling complex problems, and interdisciplinary working skills.

One limitation mentioned is the challenge of keeping the innovation going when ODS has been mainstreamed in the OU structures. The design team is keen to continue to finetune and refine the learning process, design, and approach of ODS, which at times is at odds with the IT infrastructure to keep the systems stable and going. This highlights that even with large-scale successful applications of FCs there is a continued effort needed to push the boundaries of creativity and design and cost-effective stability of systems.

CONTACT

Website HE institution blog:

https://www.open.ac.uk/courses/modules/u101

https://distancedesigneducation.com/creating-distance-design-courses/

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ADDITIONAL INFORMATION

Jones, D. (2014). Reading students' minds : design assessment in distance education. *Journal of Learning Design, 7*(1), 27-39.

Jones, D., Lotz, N., & Holden, G. (2020). A longitudinal study of Virtual Design Studio (VDS) use in STEM distance design education. *International Journal of Technology and Design Education*, (In press).

Lloyd, P. (2013). Embedded creativity: teaching design thinking via distance education. *International Journal of Technology and Design Education, 23*(3), 749-765. doi: 10.1007/s10798-012-9214-8

Lloyd, P., & Jones, D. (2013). Everyday creativity in design process. *Art, Design & Communication in Higher Education, 12*(2), 247-263.

Lotz, N., Jones, D., & Holden, G. (2019). *OpenDesignStudio: virtual studio development over a decade*. Paper presented at the Proceedings of the DRS LearnXdesign Conference 2019, Ankara. http://oro.open.ac.uk/60115/

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3. CONCLUSION

This report brought together the lived experiences and insights from implementations and evaluations of six blended/online work-based learning (WBL) teaching scenarios at Goethe University, Open University UK, and University of Zagreb. Furthermore, it shared the lived experiences from five blended/online flipped classroom (FC) teaching scenarios at Goethe University and the Open University. By using a standardised approach and method to critically examine and investigate these eleven case studies across the partner consortium within RAPIDE, we identified a range of common and unique factors that helped teachers to design and implement effective teaching scenarios in their own context.

As is evidenced in each of these case studies, substantial different learning design and pedagogical decisions were made. These decisions were in part influenced by the respective culture of the organisation and the discipline in which the teaching scenario was implemented. In particular during the pivot of COVID-19 an increasing number of teachers moved toward online WBL and online FC over time in order to cope with the pandemic and the need to continue to provide some relevant lived experiences for their students.

Furthermore, the type of students and the main pedagogical challenge (e.g., creating engaging team working experiences, identifying plant species or medical diagnosis, working on a virtual telescope at a distance, being able to work on authentic business network) substantially influenced how teachers designed their respective teaching scenarios. Furthermore, whether (or not) they received support from other researchers and decision makers substantially influenced the ambition, size, and scope of the innovation over time. Some case-studies have managed to substantially publish evidence of effectiveness of their teaching scenarios, while others have found supportive evidence from positive student evaluations. We hope that eventually all these case studies will build up a substantial evidence base of good practice, and will continue to upscale and diversify over time.

Finally, it is interesting to note that there is no consensus yet in terms of which technology works well with a respective teaching scenario for FC and WBL. Extremely diverse and interesting technologies were used to provide diverse learning experiences to students, including chat, discussion forums, open design studio, robotic telescopes, virtual learning environments, and/or web-video conferencing.

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4. APPENDIX

4.1 PROPOSED TEMPLATE TO MAP TEACHING SCENARIOS IN E-WBL/FLIPPED CLASSROOM

Structure:

- Semi-structured interviews of max 40-45 min.
- 1-2-1
- Ask before/during for any input (publications, presentations, materials, slides) that illustrates how the online WBL/flipped classroom approach has been used (this might be useful to understand the context).
- Include/alter information sheet and consent form.
- Recorded and auto transcribed via Otter.ai. Ask for approval beforehand and send informed consent and information sheet

4.2. PROPOSED STRUCTURE FOR THE QUESTIONS

1 INTRODUCTION Q0 Please briefly introduce yourself and background (warm-up question) ● E.g., State your name, academic title, your institution(s) and your position at the institution and main teaching area/research interest Q1. Tell us a little about your context. When (time) and why (context) did you start to implement work-based learning/work-integrated learning and/or flipped classroom in your course/context/setting? ● Open warm-up question ● Who is using it? ● Scale and intensity of use ● Single teacher/course, multiple, cross department? ● Tell us a bit about the duration of approach (how long has this been running) Q2. Would you consider your approach to be innovative (important at your institution/subject area?)? Why (not)? Q3. What made you to adopt this main approach/philosophy to design inclusive online WBL practices/flipped classroom Q4. What kind of technology/approach did you use to support WBL/flipped classroom? ● What were the affordances and limitations of this technology/approach/tool ● What was the balance between synchronous and asynchronous activity? ● What was the balance between f2f and online? Q5. Which graduate skills (e.g., communication, team working, programming skills X) were you aiming to achieve to develop/nurture/strengthen? How effective are these online WBL practice in terms of developing graduate skills.
2A SPECIFIC QUESTIONS - FLIPPED CLASSROOM

FC1: What is the role of the teacher in your learning scenario? Is it more

- Knowledge transfer (teacher-centered) or more
- Advising the learning process (student-centered)

- Learner role

FC2: What is the primary learner role in your learning scenario? Is it more

- active, self-directed acting or
- receiving, preserve knowledge
-

- Degree of interaction (e.g. with content, social, spatial or technological environment: I, S, R, T)

FC3: What type and level of interaction is being pursued?

- high
- medium
- low

- Degree of multimediality

FC4: What level of multimedia is used?

- high (many different media, multimodal, multicodal)
- medium
- low

- Individualization

FC5: What degree of individualization of learning processes is used, for example in terms of learning content, level of difficulty, media, learning duration and learning path?

- high
- medium
- low

FC6 Which type of flipped classroom did you implement

2B SPECIFIC QUESTIONS FOR WORK-BASED LEARNING

WBL0 How would you define work - based learning from your experience?

WBL 1 There are different forms of e-WBL/WIL. Schuster and Glavas (2017) distinguish four types of e-WILs. Which do you think your approach fits in?

Table 2
Typology of eWIL

		Degree of Technological Involvement	
		Low	High
Function of Technology	Support WIL processes *(administrative function)*	**Technology-Supported** Technology is used to support the information and administrative processes surrounding WIL *(e.g., web-based portal for industry to engage with university for the purposes of WIL)*	**Technology-Facilitated** Technology is used to prepare students for, support students during and assess students after a WIL experience *(e.g., digital platforms, such as OpenSim, used to provide simulations to prepare students for WIL)*
	Deliver WIL experience *(pedagogical function)*	**Technology-Blended** There is a combination of online and offline activities allowing agents (students, educators and industry partners) to work collaboratively *(e.g., face-to-face placements combined with digital components such as online role-plays)*	**Technology-Based** Immersive technology is employed, whereby all interactions between agents (students, educators and industry partners) are technologically mediated *(e.g., WIL through virtual reality)*

WBL2. How does work-based learning/work-integrated learning fit within your organisation?

- Do students often go to WBL? (probing questions)
  - What enables your students to be active and to inquire and interact
- Is it part of the curriculum?
- Do students receive credits/awards/financial compensation

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• Flipped classroom focused on exercises: during the class, the teacher proposes exercises focused on consolidate the knowledge. • Flipped classroom focused on group activities: the class is divided into different groups. Depending on the activity, the groups can be homogeneous or heterogeneous. • Flipped classroom focused on laboratory practical assignments: students use the laboratory to apply the concepts in "real" situations (for example, chemistry laboratories). • Flipped classroom focused on the participation of the student: students create academic resources to explain the concepts to their classmates. These resources are consulted by the other students and evaluated by the teacher (to check if they explain all the concepts that they should explain). FC7 How does flipped classroom learning fit within your organisation? • Do students often go to FC? (probing questions) ○ What enables your students to be active and to inquire and interact • Is it part of the curriculum? • Do students receive credits/awards/financial compensation	
3 OVERALL EFFECTIVENESS OF APPROACH O1. What enabled you to implement this WBL/flipped innovation? • To what extent was this influenced by students, teachers, researchers, decision makers, infrastructure/technological support O2 What problems/challenges have you encountered? How did you try to solve them?	

- To what extent was this influenced by students, teachers, researchers, decision makers, infrastructure/technological support

O3 Do you have any evidence that your approach works?

- (Not to ask this in this way, but think about the Kirkpatrick 4 level model: reaction; learning; behaviour; results)

O4 If applicable, what are you planning to change/implement in the future?

O5 Could your approach be replicated or has it been used outside your organisation/subject area?

O6 Is there anything that we did not ask that you would like to mention?

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