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Organ Donation Course in Medical Education Program

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Abstract

The number of patients waiting for organ transplantation is increasing. Today, living donors and cadaveric donors comprise the donor pool. Although it varies from country to country, organ transplants are mostly based on living donors because the cadaveric donor pool is not enough. There are different alternatives to increase the cadaveric donor pool. One of them is to raise awareness of organ donation in undergraduate medical education. Unfortunately, its effectiveness is controversial. In this section, to increase the effectiveness of the organ donation course given in medical education programs, a method proposal is presented. Medical professionals' knowledge of and attitudes toward donation have an impact on donation rates. It is possible that these attitudes and knowledge are molded during pre-graduation. As such, educating medical students may be an important factor in increasing organ donation. Learners' participation in an educational program is one of the most important factors contributing to learning. Flipped classroom is a student-oriented education method based on the combination of in- and out-of-class activities. With the use of the flipped classroom method in organ donation courses offered in medical education programs, students' knowledge and skills that enable them to discuss the topic of donation with patients can be improved.

Keywords: organ donation, medical education, flipped classroom

1. Introduction

The number of patients waiting for organ transplantation is increasing. Today, living donors and cadaveric donors comprise the donor pool. Although it varies from country to country, organ transplants are mostly based on living donors because the cadaveric donor pool is not enough. There are different alternatives to increase the cadaveric donor pool.

One of them is to raise awareness of organ donation in undergraduate medical education. Unfortunately, its effectiveness is controversial. In this section, to increase the effectiveness of the organ donation course given in medical education programs, a method proposal is presented.

Medical professionals' knowledge of and attitudes toward donation have an impact on donation rates. It is possible that these attitudes and knowledge are molded during pre-graduation. As such, educating medical students may be an important factor in increasing organ donation [1, 2]. Learners' participation in an educational program is one of the most important factors contributing to learning. Today's learner has a good command of digital technology, accesses information easily, and can easily adapt to changing learning styles and needs, and thus they have distinct differences from previous generations in thinking, and processing of information, which necessitates the use of alternative education methods. Flipped classroom (FC) is a student-oriented education method based on the combination of in- and out-of-class activities. With the use of the flipped classroom education method in organ donation courses offered in medical education programs, students' knowledge and skills that enable them to discuss the topic of donation with patients can be improved.

2. What is the flipped class model?

Flipped class model is a model which emerged following transformation of the blended learning as a result of the changes that have taken place in both technology and the notion of education [3]. The flipped learning approach describes a learning process, which progresses counter-wise the teacher-centered and traditional approach that is confined to within the four walls. In the traditional teaching approach, conveyance of a topic is realized through a teacher-centered approach in a classroom setting, while digestion of the topic takes place out of the classroom by the learner and through homework-like practices. Flipped learning approach, on the other hand, is a model of learning that proceeds in the opposite direction of the traditional teaching process, in which the learners watch pre-prepared video lessons before the actual class usually at home, and digest the topic in the classroom through several activities [4]. As an educational technique, the flipped class model is not a novel idea but has gained a reputation with the recent technological advances and the increasing access to computers and mobile devices regardless of time and space.

Flipped class model is defined as "a blended learning model that combines the traditional face-to-face teaching and online components." The learning models blended by Staker and Horn [5] are divided into four groups as the rotation model, flex model, self-blend model, and enriched virtual model. Within this classification, flipped class model falls under the rotation model category. The taxonomy developed by Staker and Horn [5] is presented in **Figure 1** [5].

Flipped class model can be described as an innovative model facilitated by the advances in technology. The objective of this model is to offer learning opportunities independently from time, space, and means and to create settings of active learning where interaction is prioritized. Flipped class model encompasses utilization of all sorts of Internet technologies to enforce
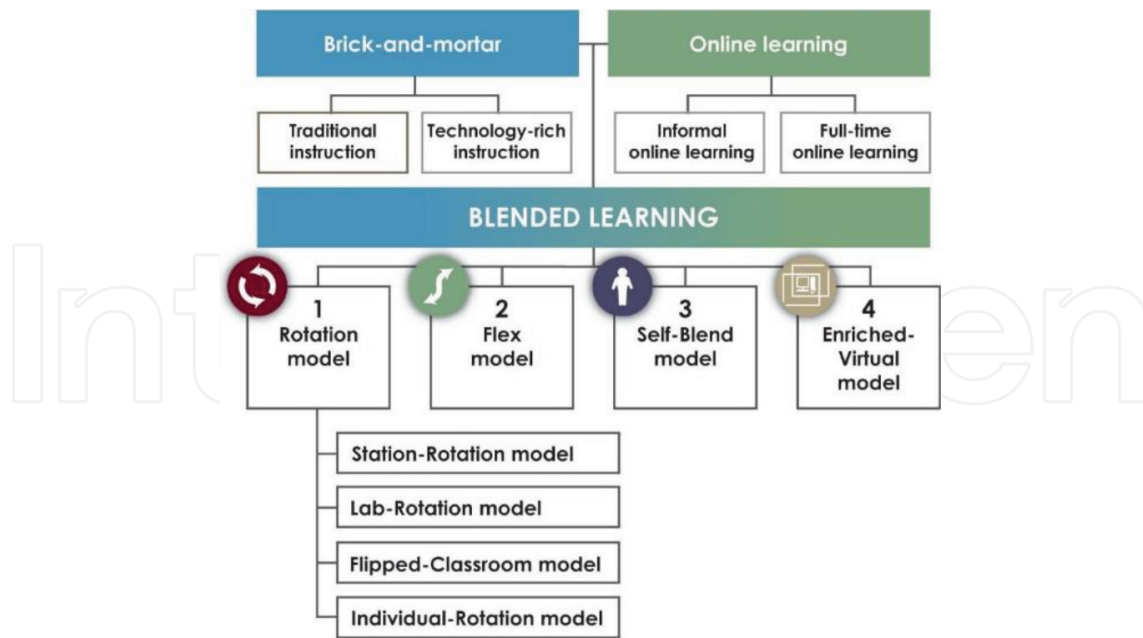
Figure 1. Blended learning taxonomy. Source: Staker and Horn [5].

in-class learnings, and thus the educator spares more time to interact with the student rather than delivering the lecture. In traditional educational settings, students devote their class time to listening to the lecture and, if time remains, practices about the information they have just learned [4, 6, 7]. In this model, on the other hand, the traditional classroom paradigm is reversed to enable students to learn the concepts of the lecture outside the classroom through online educational tools such as video, film, and audio materials. Thus, in-class time is devoted to discussions, problem-solving, and practical training [3, 4, 8, 9].

The activities covered in and out of the classroom for students and instructors in traditional education and flipped class models are presented in **Figure 2** [10].
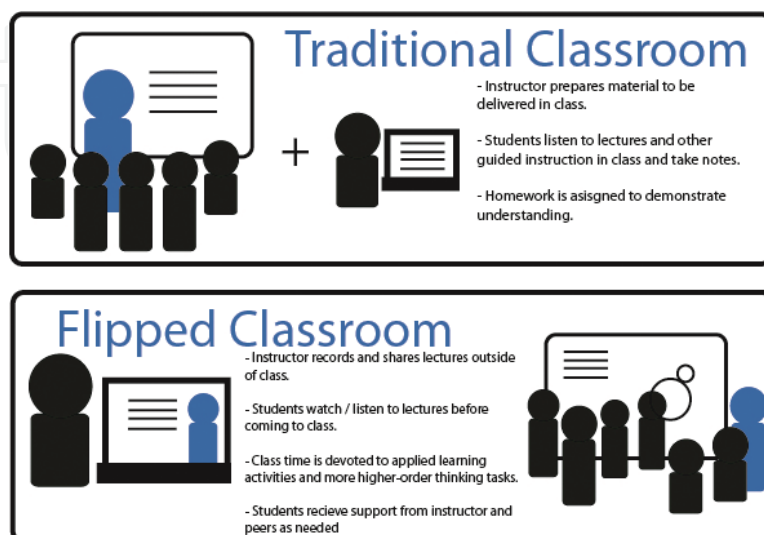

Figure 2. Features of traditional education and flipped classroom. Source: Saint Louis University [10].

As can be seen in **Figure 2**, the flipped class model, which embodies the combination of active education models that require face-to-face communication with educator-centered methods that make less limited use of technology as well as varied opportunities offered through activities in and out of the classroom, will perhaps help us to access today's learners more easily.

The flipped class model involves the students in the learning process and combines the benefits of direct delivery of a lecture used in the traditional learning method with those of active learning. Hence, flipping the classes is being supported as a teaching method that will enable usage of the time to be devoted for delivering the lecture in the classroom much more efficiently through the use of currently available technologies which facilitate access to information. Thus, active learning methods that can be used within the classroom offer the opportunity for teachers to act as a guide while assisting the students to advance their skills such as peer communication, collaborative learning, and taking on their own learning responsibility, thus improving active learning activity. The skill of taking on one's own learning responsibility is reinforced by coming to the class prepared and assuming active roles in in-class activities [11–13]. This method offers advantages to the instructor as well, particularly enabling them to understand and correct the thinking/reasoning errors of the learner and achieve the learning goals with more interactive methods instead of delivering a lesson in the classroom [11, 14]. Besides, although it takes time to prepare, the flipped class model allows the teachers to actualize transformative experiences for their students, build flexible teaching strategies, and make the lessons appealing [15].

The underlying idea of the flipped class model is to devote in-class time to active learning. This is a model that encourages the use of technology in the classroom as well as at home (e.g., video records) for active learning. With the flipped class model, most of the time spent in the classroom is used for communication in comparison to the traditional teaching [16]. This model is student centered. Each student has the responsibility to understand the material at a basic level before coming to the class, and this enables the student to take interest and participate in classroom discussions [17, 18]. Knowledge acquisition takes place at the own pace and guidance of the student; when and how the student will view the content is at their own control. The instructor provides guidance on the content, interactive practices, and creative thinking to facilitate learning, ensures deepening the information, and offers feedback. By offering materials of varying formats, the instructor also makes sure that learners with different learning styles are addressed to [18–20].

The features of the flipped class model are described as follows, emphasizing the word "flip" as an acronym [21]:

- Flexible Environment: It describes a learning setting that allows for the flexibility for students to choose when and where they will learn, which allows the teacher to organize the learning setting in different ways to be personal or cooperative.

- Learning Culture: It is a student-centered approach as opposed the teacher-centered traditional model. Means for profound and creative learning are offered during in-class time. Involved in their own learning processes and evaluating their own learnings, students participate actively to the structuring of information.

- Intentional Content: Educators focus on helping the students improve their conceptual understanding. Educators decide what they will teach and what materials the students will study themselves.

- Professional Educator: The role of educators is more important in the flipped class model. In this model, educators must continuously observe the students, offer instantaneous feedback, and assess the students. Although educators have a less visible role in the classroom in this model, they are the required element for the flipped class model to develop.

With the growing interest toward the flipped class model, Bergmann et al. describe that the model leads to misunderstandings by the practitioners of it. According to the authors, flipped class practices [22]

- are not synonymous with online videos. In this model, interactions emerging during face-to-face time and meaningful learnings are more important

- are not online lessons

- are not replacement of instructors and teaching by videos

- do not mean unplanned, non-programmed, and disorganized work by students

- do not mean that students will spend the whole lesson time looking at a computer screen

- do not mean that students will study alone

3. The advantages and disadvantages of the flipped class model

Flipped class model seems advantageous, in that it encourages single-handed learning, new ideas arise in platforms of discussion, individuals come prepared to the subject, allows flexibility in watching videos, helps understanding of the subject, contributes to pre-learning, motivates learning, and offers the opportunity for the individuals in accordance with their characteristics. Besides, the flipped class model increases student's commitment to the lesson, strengthens team skills, provides individualized student guidance, focuses on class discussions and offers freedom of teaching [23, 24].

On the other hand, the flipped class model appears disadvantageous because of problems with Internet access, students coming to the classroom without necessary pre-work, some students resisting to new applications, and lack of simultaneous feedback [25].

Besides, Bergmann and Sams [4] described two major problems that may be experienced in the flipped class model as the lack of means to check whether the students have watched the video and the vagueness of what the students who have not watched the video prior to the lesson will do in the classroom, and offered the following suggestions for the problems [4]:

- to verify whether the students have watched the video, having the students log in to the page with a username and password, or come to the classroom with questions on the video prepared beforehand.

• for the students who have not watched the video, having them watch it on a computer kept at the classroom. Thus, the students will understand the importance of participating in classroom activities.

4. Theoretical bases of the flipped classroom practice

The flipped class model regards education as a lifelong process. This model is a learning approach that is based on the pragmatist philosophy. Pragmatist approach appraises accuracy or reality only by looking at the consequences of the action and emphasizes benefit. All knowledge and theories are used to make life easier. In this sense, the value of a knowledge or thought is associated with its being beneficial. Therefore, outcomes, or in other words implementations rather than theory, stand out. The student is thus carried to the center of education. The reflection of pragmatism to education manifests as progressivism and reconstructivism advocating the concepts of change, experiences derived by the individual, and learning responsibility.

Progressivism, in reaction to the oppressive and conservative approach of traditional education, considers the essence of truth as change and freedom. In this understanding, training that is intertwined with the evolving life should naturally be progressive. Progressivism places students, who develop themselves and learn to learn through personal experiences, at the center of education. It advocates a teaching approach which preserves the core of change and aim at exhibiting democratic behavior [26, 27].

On the other hand, reconstructivism considers education as a means to achieve a more modern society. The society must renew and reshape constantly. Potential detrimental effects originating from changes would otherwise be unavoidable. Because change is inevitable. In this understanding, the role of actualizing change is entrusted to students who are described as social engineers. Schools should therefore raise social engineers who are able use the fundamental dynamics of change, that is, science and technology. Reconstructivists object to teaching traditional subjects at schools. Methods to solve ever-changing problems should be taught instead. Because only thus can it respond to the requirements of modern life. What is being tried to convey here with the modern life concept is, according to reconstructivists, is group life. From this perspective, school is a special social institution established to prepare students to group living [27].

Contemporary philosophical approaches developed later entrusted schools with the task to reach more modern societies. It was expected from the schools to perform this task to focus on developing problem-solving and learning to learn skills and be able to transform themselves into life settings that support cooperative learning so that the student may be more active in their lifelong learning processes. Also, an emphasis has emerged to use some models when performing this task. As the first of these models, the flipped class model was proposed and began to be used in these schools.

The main reason to use the flipped class model was to have the students at the center, to create a learning setting which involves activities that target research making, creativity, and problem-solving to transform classrooms into a laboratory or a studio to strip teachers out of their information-radiating roles and students out of their roles as actors who are merely takers of

information and to convert them into individuals by processing and shaping them, shortly, to introduce a "constructivist" consciousness. The pedagogic foundations of the flipped classroom approach are based on the constructivist learning theory. According to this theory, students do not take the information as is during the learning process. On the contrary, students take information as active constructive participants throughout the learning process and the responsibility of learning is solely on the student. The process or restructuring information is accomplished through problem-based learning, simulation and pair-share-like active learning strategies. In a flipped classroom, out-of-classroom learning processes depend entirely on self-controlled learning. In-class learning activities comprise higher-order cognitive activities that utilize active learning techniques including decision-making and problem-solving, which students perform through interaction. Constructivist theory does not deny the role of instructor in the learning process. According to the constructivist theory, the instructor is not the wise man who knows everything on the scene but the person who take sides and collaborates with the student during the learning process. Also in a flipped classroom, the instructor does not deliver a lecture but assumes to role of facilitating the learning process in the classroom [28–33].

In summary, the flipped class model encompasses such concepts as constructivist approach, research-based method, active learning, and student-centered learning [13].

5. Flipped class model and Bloom's taxonomy

In 1956, Benjamin Bloom described the incrementally organized "Cognitive Domain" taxonomy. The main theme of this taxonomy was gradual and hierarchical listing of the things the educators want the students to know (learning targets). Bloom's taxonomy—which consists of remembering, understanding, applying, analyzing, evaluating, and creating stages—progresses from simple, concrete, and easy-to-learn behaviors representing the first step of learning to more complex, abstract, and harder-to-learn behaviors. It was also taken into consideration that each behavior is to be the prerequisite for the other, where they pertain to the same subject. In other words, the first behavior is the precondition of the behavior in the second step. Moreover, the first behavior is included in the behavior in the second step.

In the traditional classroom practice, the educator presents the new information by delivering a lecture. In this process, the students are considered to have reached the first two steps of Bloom's taxonomy, that is, remembering and understanding. After the class, students perform by themselves as homework the exercises of the more complicated higher steps. In the flipped classroom, on the other hand, students carry out the part that involves the relatively easier initial steps, that is listening to the lecture, at home by themselves. Practices for the difficult and complicated higher steps are accomplished through active learning methods accompanied by the educator. The students can thus advance up to higher-order cognitive skill stages in the taxonomy (**Figure 3**) [4, 33–35].

When viewed from the perspective of the reorganized Bloom's taxonomy, learnings at the level of the first to steps of understanding and remembering are accomplished by preparing
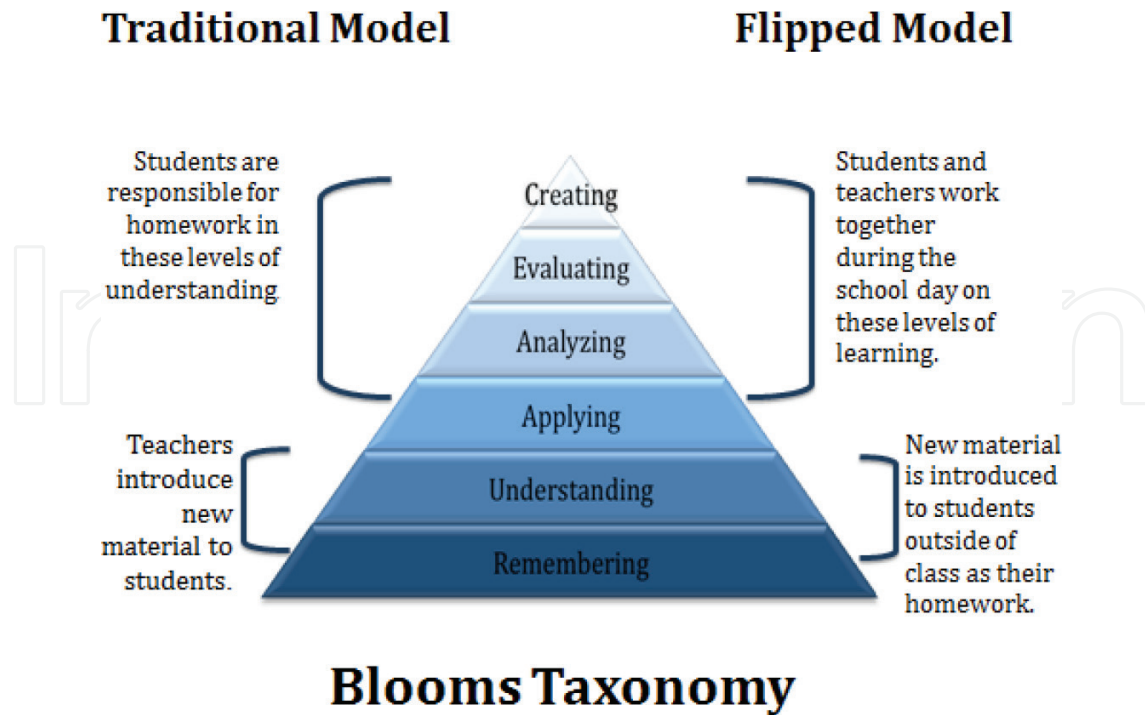
Figure 3. Bloom's taxonomy related to traditional and flipped learning. Source: Ouda and Ahmed [33].

materials at home, while learnings at the levels of applying, analysis, evaluation, and creating are achieved during the active learning processes including in-class practices, discussion, and problem-solving. An important advantage of the flipped class model is that it can incorporate the learning targets of each step in the Bloom's taxonomy.

6. Emergence of the flipped class concept

The conception of traditional teaching describes a process where the educator is deemed as the primary source of information and the action of learning is confined to within school walls and school time. However, the advancing education, technological opportunities, rapidly growing body of knowledge, and changing student profile force learning concepts to change and transform. With the changing educational paradigms, new learning approaches, models, and strategies to enhance the efficacy of learning in learning processes and encourage the learners in this respect are being sought [36–38].

Although referred by a different name, the foundations of the flipped class model were first laid in Miami University by the professors of departments that involve too much reading tasks including law, philosophy, sociology, and psychology because the duration of lectures was not enough to deliver the content [3]. With this model that was first being used in higher education, it was aimed to develop a system that will meet the learning requirements of students with varying styles of learning. Covering different educational resources and appealing to all learning styles, the system was named "Inverted Classroom". When planning the system, Lage et al. [3] first determined the subject and then recorded to videotapes while delivering the determined lecture during the class. The recorded lesson was copied and handed to

the students. Students who wished so found the opportunity to watch the lecture over and over again and could fill their gaps of the subject. Later, PowerPoint presentations used during the lecture were voiced over and uploaded to web together with complete lecture notes, making them available to students. Getting the printouts of the written resources uploaded to the web, students were able to take the necessary notes on these resources and found the opportunity to undertake a more comprehensive and planned work. Coming to subsequent classes after studying the ready lecture notes they have, students discussed the points they could not understand in the company of their teachers right at the beginning of the lesson and practiced in depth on the subject once the points that could not be understood were eliminated, and engaged in laboratory work where they put their learnings into practice. For all these, a website dedicated for the lecture to access all students and address every learning style was built. The built website was uploaded with materials such as previous exam questions, worksheets, lecture presentations and lecture video records, and were shared with students. Students' questions were answered online in chat rooms created during specific time frames. A virtual library was put together over the established website. This education model was even offered for the appreciation of students and lecturers and a questionnaire and an assessment scale including open-ended questions were applied. While the developed model was received very well by students and lecturers, this first detailed and elaborately planned implementation did not attract the anticipated attention.

The individuals who ensured that the flipped model survived up to the present time and found widespread use were Jonathan Bergmann and Aaron Sams who worked as chemistry teachers in the Woodland Park High School, USA (2007). Bergman and Sams observed that students who could not attend a lesson for various reasons (students taking part in sports games, miscellaneous activities) were unable to fill their learning gaps afterwards. To solve this problem, the duo initially developed a software that could voice over PowerPoint presentations and convert them into a video format and had the students who could not attend a lesson for various reasons watch these videos. The students who could not attend classes learned their missed lessons by these videos. This attracted the attention of other students, and the videos were made available for viewing for all students, regardless of their attendance to the class. By means of the videos, students who missed classes were able to learn the lesson, while those who attended the classes found the opportunity to rehearse and capture the notes they had missed during the lesson. Shortly, these videos were heard of by other schools, students, and teachers who also began to use the videos. With the videos gaining fame in a short span of time, Sams raised the idea of replanning the teaching process. Bergman and Sams [4] asked "When do students really need teachers?" and argued that students needed teachers when they were solving problems at home rather than when the lecture was delivered, and that the students could learn the subject by themselves through videos. Bergman and Sams uploaded other lessons to web in the same way and described students how they should watch videos and take notes before coming to the class. Because when the students arrived at the classroom, the bits that were not understood were now apparent, the parts of the content that were not apprehended were figured out rapidly, and more time was spared for problem-solving and laboratory activities for which students actually needed a teacher [4].

In short, the method of these two teachers has created a great deal of impression and, in 2012, the faculty staff of Northern Colorado University established a database by packing lecture contents

to videos. Later on, Salman Khan, with the math videos he recorded without any commercial purpose, helped the model spread wider and be known as "Flipped Classroom" [39].

The title of the book released by Bergmann and Sams in 2012 was "Flip your classroom; reach every student in every class every day" [4]. As the title suggests, the main objective of the "flipped classroom" method is to make classroom lessons available using technology and to reach all students with different types of learning by making in-class activities more active.

7. Implementing the flipped classroom method

Flipped classrooms is a method in which the learner, viewing the learning topics by means of virtual technologies and videos prior to the classroom lecture and makes preparations and then comes to the classroom, engages in face-to-face interaction with the instructor and peers with the instructor assuming the role of a guide and facilitator. There are two distinct components of the flipped classroom exercise. These are out-of-class and in-class activities. Out-of-class activities is a platform involving technical equipment which aims to form a resource for learning where the learners will access the information they will acquire themselves. In-class activities are the part where interactive methods are used [4, 13, 40–42]. **Figure 4** demonstrates the planning of out-of-class and in-class activities in the flipped classroom exercise.

The cyclical steps in **Figure 5** can be used in structuring lectures in flipped classrooms [42].

Step 1. The content and learning outcomes should be prepared.

- Students should be informed of the flipped classroom method and should be clearly explained what are being expected of them.

Step 2–3. Technical hardware to be used out of and in the class should be prepared, choosing systems that all students can use easily and uninterruptedly (**Table 1**) [40].

- Out-of-class teaching materials suitable for the content and learning outcomes of the chosen lecture should be prepared (**Table 1**). When preparing teaching materials, various resources
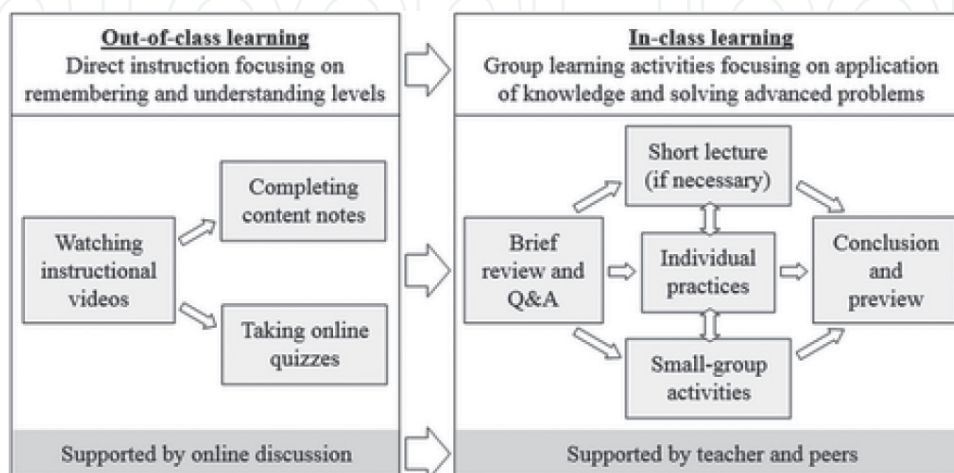

Figure 4. Out-of-class and in-class activities. Source: Lo and Hew [41].
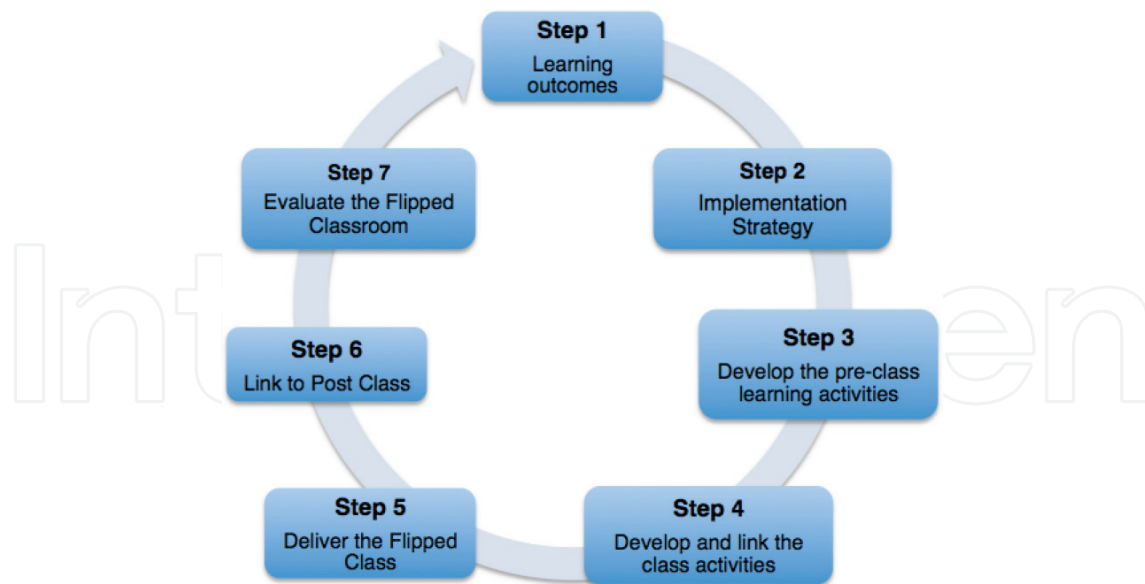
Figure 5. Structuring lectures in flipped classrooms. Source: Karanicolas and Snelling [42].

including lecture notes, research tasks, field work, papers, voiced-over PowerPoint presentations, reports, cases, websites, blog contents, educational games, videoconference recordings, demonstration, and lecture videos can be made use of [43–46].

- For suitable videos, web-sourced open resources may be used, but educators may also make their own videos. Bergmann and Sams [47] recommend that video lessons be prepared by the educator personally [47]. Video lessons prepared by the educator make it possible to initiate student-educator interaction during out-of-classroom activities, resulting in readier acceptance of the model among students [48]. The duration of video lessons is very important. Prolonged video lessons are hard to watch alone, which reduces the success of the exercise, and are also not welcomed by the students [45, 49, 50]. The recommendation is mini video lessons of 20–30 mın in duration [50, 51].

Step 4. In-class activities should be planned. Methods such as discussion sessions, group work, project development work, problem-solving, question-answer exercises, and case discussions can be used in in-class activities. The key is to prefer teaching methods in which knowledge can be used with the highest efficiency. The more in-class activities are supported by the educator, the higher cognitive learning, and reasoning skills will develop [11].

Step 5–6. Flipped class model should be delivered and information on how post-class link will be made should be provided.

Step 7. Assessment and evaluation method should be decided at the very beginning and should be appropriately structured.

- Flipped classrooms possess quite suitable conditions for both formative and summative evaluation [52]. Although studies do not indicate increased success versus the classical system in summative evaluation scales, there is compelling evidence that it improves analytical thinking skills of the learner [4, 6, 13, 32, 49, 50, 53–55]. The assessment and evaluation method should be changed when the model is not improving students' examination success [40]. Also

according to the constructivist theory, assessment and evaluation methods should be changed accordingly after teaching processes in which active teaching strategies are extensively used.

• Formative evaluations are important in monitoring the improvement of the learner and checking the efficiency of the in- and out-of-class activities.

Resource	Features
Externally produced video content	iTunesU: Large online catalogue of free educational content
	TED-Ed: Free videos available which can be customized by educators for use with own students
	Vimeo: Video-sharing website, not restricted to educational content
Presentation software	Microsoft PowerPoint: Most well-known presentation software, slides can be narrated to produce short videos
	Powtoon: Software which allows users to develop colorful animated presentations
Screencasting software	Camtasia: Allows capture and personalization of videos, can be viewed from mobile devices
	ShowMe: Free iPad app that allows educators to create and share whiteboard-style lessons with students
Learning management systems	Moodle: Open source web platform for online learning activities
	Blackboard: Commercially available platform for online learning activities
Other content delivery applications	Edmodo: Virtual learning environment with online discussion and poll facilities
	DropBox: Web-based repository that allows educators and students to share documents and large attachments
	Educlipper: Online social platform that allows educators to collect, store, and share web resources with students
Social networking applications	Twitter: Online social networking platform where "hashtag" categories allow students to hold online, interactive discussions during class
	Wikispaces Classroom: Wiki application which allows students working in small groups to record and playback discussions, either to group or during plenary session
Video-calling and webcast software	Skype: Videoconferencing tool that allows outside speakers to be involved in classroom discussions from a different location
	GoToMeeting: Webcasting tool that allows educators to share screens and interact with an outside speaker
Audience response systems	TurningPoint: Commercially available "clicker"-operated system, allows real-time feedback and polling
Other polling applications	Poll Everywhere: Web-based alternative to clickers. Free for audience size up to 40 people

Source: Moffett [40]

Table 1. Learning resources that can be used in a flipped classroom [40].

8. What should be paid attention to in a flipped classroom?

It is possible to say that the flipped learning approach contributes to more active involvement of learners in the learning process and help them learn better by increasing their motivation. However, it also appears that very diligent and meticulous work is required in implementing it. There are many points to consider, especially by the educator, in implementing the flipped classroom concept. Foremost among these is the preparation of videos that are included in out-of-class activities. When preparing videos, having an extended video length causes students to get distracted and reduces the viewability of the video, decreasing the success of the practice. Therefore, the recommended duration for the videos was limited as 20–30 min [38, 50, 51]. It may also be useful to add motivating elements to the videos and to add worksheets or questions at the end of the videos to be able to understand whether students have watched the video [45, 47, 51]. Videos prepared by the educator will improve acceptance of the model by the students. This is because flipped classroom exercise should be adopted not only by the educators but also by the students [37]. The practice should be clearly explained to the students for them to adopt the model. Studies report that students find it difficult to internalize the practice when they are not open to change and sometimes because of cultural habits, especially in Asian countries [46, 56]. Students and educators who are equipped with knowledge about their duties and responsibilities surrounding this practice will contribute to successful implementation of it.

Another point to consider is to encourage students to come to the class prepared. For this, in- and out-of-classroom activities should be defined and planned very well and executed according to the plan. Effective use of time and material and the qualities of in- and out-of-classroom activities are the factors that directly affect learning [49, 50]. For example, out-of-classroom activities should be planned so as not to place excessive burden on the student and care should be taken to ensure that materials are comprehensible, especially for difficult subjects. In addition, out-of-classroom activities should be arranged to cover not more than 60 min a day. In in-class activities, on the other hand, approaches should be offered to learners, which allow them to ask questions to improve their deep learning skills, to make associations by following the flow of thoughts, and to make assessments and estimations. Learnings should be supported by proper feedback at proper times and opportunities should be offered for the learner to reflect so that they can comprehend their own learnings. This not only supports learning efficacy but may also be used to formatively evaluate student's knowledge [43–45]. Methods to be used in assessment and evaluation should also be structured to the content and targets of education. Quizzes measuring conventional knowledge should not be maintained when the classrooms are flipped.

9. The place of flipped classrooms in medical education

The future of medical education lies in technology. The cost and efficiency technology allows represent a paradigm shift in how we teach and utilize faculty, space, finances, and other resources [57]. Today's physicians who completed their education in the previous century are

now face to face with new medical students with different ways of thinking and learning. Today's medical students' characteristics are their good command on digital technologies, easy access to information, and changing learning styles and needs, and they exhibit differences in thinking and processing information compared with the generations before them [4, 12]. This makes it imperative to develop alternative teaching-training methods in medical education.

Looking at the medical education literature, examples of implementing the flipped classroom model are seen in the medical faculties in the USA and Central Asian countries. The most radical declaration for the method took place in the Medical Faculty of Stanford University. A model for medical education before graduation based on the flipped classroom philosophy was described by faculty members, Prober and Khan [58]. The two faculty members declared that the current systems were not flexible and did not support individual learning, and that they intended to make the method more common and increase its utilization [56]. There are also attempts to implement the model in Hawaii, as the joint major project of the Accreditation Council for Graduate Medical Education (ACGME) and local medical faculties [59]. Gillous et al. [60] reported that this method was used in the first year of educational programs in medical faculties in France since 2006 [60]. Interestingly, favorable results of the studies performed with the flipped classroom approach in medicine, nursing, and pharmacy domains have been influential in regarding the flipped classroom concept as a pedagogical model.

It can also be seen in the literature that flipped classrooms is a method, which can be used in medical education. Attention of students with intensive course load particularly during the preclinical education period can be grabbed and their motivation can be increased. Also, this method seems to be an opportunity in learning basic mechanisms and integrated pathophysiologic information in the preclinical phase. And in clinical education, flipped classroom can be used in acquiring higher-order cognitive skills such as critical thinking and evidence-based reasoning and application of clinical knowledge including deep learning strategies (approaching patients, initial diagnosis, differential diagnosis, treatment, complementary approach, etc.).

Current evidence suggests that the flipped classroom approach in health professions' education overall yields a statistically significant improvement in learner performance compared with traditional teaching methods. In addition, the flipped classroom would be more effective when instructors use quizzes at the start of each in-class session [61].

In summary, flipped classrooms can be used in medical education in courses and applied training which require conveying the knowledge to a learning level of and above analysis in Bloom's taxonomy. This should therefore be taken into account when determining the content and targets of learning.

10. Using flipped classrooms in organ donation courses

Many organs should function in certain harmony for the human organism to work perfectly. Diseases occur when dysfunction appears in any of these organs. If the dysfunction is left untreated or becomes irreversible, this means that a threat to life has begun to shape, and life expectancy decreases as functional loss progresses. A person at this stage requires a new organ to sustain life. If that organ is the kidney, the person must be confined to dialysis machines for

the rest of his/her life but if the organ with failure is the heart, lungs, or liver, death is inevitable. Unfortunately, all these patients could lose their lives if donation is not found in good time. One should bear in mind that organ transplantation is the only hope for these patients to survive. Excellent results can be achieved and lives can be saved with organ transplantation, but, unfortunately, people seem not to be sensitive enough regarding the topic of organ donation. When cadaveric organ donation falls short, the frequency of transplantations from living donors increases to prevent life losses. Under these circumstances, individuals with brain death are buried along with their organs, while healthy people are forced to give their organs to their significant other.

There is globally an increasing number of patients whose lives depend solely on organ or tissue transplantation. This increase also escalates the importance of organ and tissue transplantation. Many studies are being performed on this topic, particularly to raise awareness, but the effectiveness of these studies are disputable. People's awareness needs to be raised to increase cadaveric organ transplantations. The major role here belongs to physicians. Raising awareness is only possible by ensuring that physicians or candidate physicians understand the importance of topics such as cadaveric transplantation, donation, and brain death. By including organ donation as a topic in continuing professional development and undergraduation, medical education programs may emphasize the importance of the subject for physicians or candidate physicians. However, the effectiveness of these activities will still be disputable as long as they remain as didactic courses.

The flipped classroom model, which is an active teaching method, can be used in organ donation courses in medical education programs. Learners' participation/contributions in an education program are one of the key factors that maximize learning/teaching. With the use of the flipped classroom education method in organ donation courses offered in medical education programs, students' knowledge and skills that enable them to discuss the topic of donation with patients can be improved. Because when awareness develops, a number of new cognitive schemes occur in an individual's mind. The way individuals react to their experiences may be enriched by increasing the awareness on the thoughts and feelings that drive behaviors.

The objective and learning targets should be identified first when designing organ donation courses using the flipped classroom model in medical education programs. Students should then be informed of the model and be explained in detail what is expected of them. Technical equipment and educational materials that will be used out of the classroom and in the classroom should be prepared. It may be ensured that students understand the topic of organ donation by using voiced over PowerPoint presentations as educational materials. It may also be useful to add videos developed by the educator or presently available videos on organ donation as educational materials. In short, students may be asked to come to class prepared after learning about organ donation topic from videos and taking online quizzes before the actual lesson. During class time, students may be given the opportunity to practice what they have learned by the use of active learning methods as well as case scenarios, discussion sessions, question-answer exercises, project development work, and/or patient simulations. Studies emphasize the importance of in-class activities. Therefore, activities which allow students to practice their pre-class learnings and advance their professional competency should be planned for in-class activities, particularly in clinical case analyses. It should, however, be borne in mind that students not rehearsing their pre-class learnings in the class as part of the

lesson (double course) and absence of a connection between pre-class learnings and in-class practices will result in failure. Testing of the students at the end of the class should aim to evaluate their higher-order cognitive learnings on organ transplantation topic such as practice, analysis, and assessment. Evaluation and assessment activities may utilize case analyses or simulated patient communications.

11. Conclusion

The flipped classroom approach involves problem-solving and cooperative learning as well as hybrid and blended learning activities and focuses on more active involvement of the learner in the learning process. With the flipped learning approach, learners find the opportunity to practice their learnings with both the educator and their peers through activities in the classroom such as discussion and project work and that the learning process continued out of the class as well. The role of the educator in this approach is to ensure that the contents are prepared before the class in a format that can be viewed online, to answer students' questions during the class, to provide feedback, and to encourage them toward active learning.

The flipped classroom model is preferred especially because it supports student-centered approaches and enriches curriculums. For educators, it seems to be important in being a setting in which students may be taught critical and independent thinking and gives them the opportunity to develop their learning strategies throughout their lives.

It is important to state that the flipped classroom cannot be the only form of education. Medicine is still very hands-on, and nothing can replace that experience. Thus, the flipped classroom and case-based instruction cannot be the only form of instruction. However, this model represents a potential future as a means for improved instructional efficiency [57].

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