

Developing a model of education during crisis: An action research study in psychiatry

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“Submitted for the Degree of Master’s in Health Professions Education:

Assessment and Accreditation, Keele University”

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ACKNOWLEDGEMENTS

First, I wish to express my deepest gratitude to my supervisor, Dr. Jo Hart. Her genuine guidance, professional advice, insightful comments and indefinite patience were invaluable and helped me accomplish the project.

I would like to thank warmly Dr. Janet Grant for her advice, expertise and enthusiasm. Her active input and encouragements are whole-heartly appreciated.

A special thanks to Leo for his constant availability and timely assistance.

To my husband and my two beloved daughters. This work couldn't be achieved without their infallible support and encouragements.

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ABSTRACT

Background: The Covid-19 pandemic has led to an abrupt disruption in medical education and clinical training occurred. Medical schools were challenged by rapidly shifting in-person learning to online learning to sustain educational activities. At the Psychiatric Hospital of the Cross, Lebanon, there was a necessity to sustain educational activities to keep psychiatry trainees engaged and help them reach clinical competencies in the context of a pandemic and economic uncertainty. The aim of this study is to determine the gaps encountered during training and that were pinpointed by the crisis, develop educational online strategies to respond to trainees' needs, and evaluate the impact of these learning strategies on learners' education.

Methods: An action research involved three stages, with the participation of 8 trainees and 3 programme directors. During the first stage, an assessment needs with data collection and data analysis were conducted. The second stage encompassed the implementation of an online learning module. The third stage was a reflection on the module with feedback on satisfaction, quality, strengths and weaknesses in order to improve learning and make necessary changes.

Results: The trainees endorsed the shift to online learning. There was an evident enthusiasm and engagement. The satisfaction rate was high. However, there was a need for more interaction, collaboration and more complex real-life case-based learning with deeper discussions.

Discussion: diverse educational techniques can be integrated in an online learning curriculum for a comprehensive education in psychiatry training. These strategies should be adapted to the objectives of the online activity and cover the domains in knowledge, skills and attitudes needed to graduate competent professionals.

LIST OF ABBREVIATIONS

ACGME: Accreditation Council for Graduate Medical Education

ACGME-I: Accreditation council for Graduate Medical Education-International

CLT: Cognitive Load theory

CoI: Community of Inquiry

EVD: Ebstein Virus Disease

OCL: Online collaborative learning

PG: Postgraduate

PHC: Psychiatric Hospital of The Cross

SARS: Severe acute respiratory syndrome

HIV: Human immunodeficiency virus

INTRODUCTION

The principal aim of postgraduate training in medical education is the development of professional competence. Professional competence is defined as the “capacity of a person to choose a thoughtful behaviour in order to manage a situation or task in a particular content of professional practice by adopting knowledge, skills, judgements attitudes and personal values with roles and responsibilities” (Govaerts, 2008).

Classically, graduate medical education was mainly involvement in patient care with informal supervisions and assessment (Goldhamer, 2020). Trainees were able to graduate once the period of training was over without major blocks. In 1999, The Accreditation Council for Graduate Medical Education (ACGME), which accredits training programme in the United States, integrated six core competencies for more organised and efficient physician training, introducing competency-based curricula and assessment. A framework for assessing physician competency was developed through entrustable professional activities and specialty specific milestones. Milestones describe performance levels trainees are expected to demonstrate for skills, knowledge and behaviour in the six competency domains. They can provide a framework for graduate medical education (GME) to ensure that graduate trainees achieved a high level of competence (The Milestones Guidebook, 2016). These competency standards and assessments have been adopted internationally.

Postgraduate training and adaptation for Covid-19 and other pandemics

The current COVID-19 pandemic is caused by severe acute respiratory syndrome Coronavirus 2 (SARS-Cov-2) (Adbikari, 2020). The first case was first identified in Wuhan, Hubei Province, China, in December 2019. The World Health Organisation (WHO) declared the outbreak as a Public Health emergency of International Concern on January 30th 2020 and recognized as a pandemic on March 11th 2020.

During pandemics, teaching hospitals have a duty to protect students, faculty, staff and patients by enforcing adequate safety measures (Chang, 2020). They also need to adapt educational activities in alignment with safety measures.

The surge of COVID-19 has dramatically affected clinical work load and subsequently reduced learning opportunities for trainees in all specialties internationally (Goldhamer, 2020). Many universities and teaching hospitals may be uncertain of how to best provide medical education in these special circumstances (Kelly, 2020).

Nevertheless, Covid-19 is not the first coronavirus pandemic. SARS hit for the first time in 2003 (Rieder, 2004), which also impacted medical students' learning. In 2003, clinical clerkships and electives were suspended in Chinese and Canadian medical schools, after the infection of 16 medical students in Hong Kong through contact with an infected patient. Education was continued through online problem-based learning (Longhurst, 2020). One study from Toronto, Canada described a process of setting up technology advances to deliver continued education to maintain regular contact between teachers and learners during the outbreak (David, 2004).

Rapid changes in medical education have successfully worked previously. In 2014, due to the high risk of Middle East Respiratory Syndrome (MERS) among students, clerkship rotations were discontinued in one hospital in South Korea (Park, 2016). In addition to precautionary measures (hands washing, temperature taking, masks using), lectures and classes were converted into remote learning system, to link the hospital and the main campus. Instructors were present in the hospital classroom while students attended from campus. Lectures were audio-recorded to enable students to watch the lectures and at the same time provide the opportunity of interaction between teachers and students (Park, 2016). During the Ebola outbreak, a framework aligned with the ACGME core competencies was devised in West Africa to assist achieving residency educational requirements (Mo, 2016). The framework delineated goals and objectives to address patient care, medical knowledge, practice-based learning, interpersonal and communication skills, and professionalism with assessments to protect competency. HIV, SARS, EVD addressed the way to fight deadly infectious diseases whilst preserving medical education (Katato, 2020).

Trainees adapted quickly to COVID-19 spread by taking what they have learned from other outbreaks to pursue their medical knowledge and patient care. Albeit prior arrangements, laws and regulations for services and disaster management in epidemics like COVID-19 and other disasters, there is no standard practice for the sustainability of medical education in such cases (Öşçelik *et al*, 2020). However, CoVid-19 pandemic imposed many changes in the way medical education is delivered with shift from traditional in-classroom teaching to more technology-based virtual learning (Shah *et al*, 2020). Similarly, the training of graduates and fellows who relies on hands-on experiences had to transition to more virtual didactic experiences. Technological innovation had already started before the advent of COVID-19 and began to transform medical education, healthcare and social interactions. The Covid-outbreak

has solely hastened the investment in these tools. Technology tools and platforms are now being used deliberately, promptly and meaningfully more than ever (Shah, 2020).

The ACGME supplies guidance to handle these challenges (ACGME guidance, 2020) by authorizing flexibility in some programme requirements, whereas firmly maintaining duty hours, appropriate supplies, resources and supervision. The reduction of work volume may hinder the trainees' ability to acquire sufficient hands-on experience or accomplish the minimum case requirements set by the ACGME specialty programme requirements. The ACGME has permitted flexibility for the programme directors and clinical competency committees to decide upon the readiness of the trainees for independent practice (ACGME guidance, 2020).

Context of the research study

Mental health issues are of global importance with mental disorders continuing to grow, with significant impairments on a social, economic and personal levels (WHO, 2014a). In crisis or post-disaster settings, there is an increased need for mental health providers to address the trauma engendered by the disaster (Mollica, 2014). Covid-19 pandemic increased levels of anxiety, through fear of contamination, stress, grief, depression and the consequences of the social and economic havoc that is occurring on individual and societal levels (Blumenstyk, 2020). Hence, the demand for mental health care is rising, while access to face-to-face treatment is hindered.

As with other specialties, training directors of psychiatry postgraduate programmes and fellowship programmes had to respond quickly to the crisis by adjusting workflow across clinical settings while preserving educational momentum and protecting the mental and general

medical health of trainees (Richards, 2020). In order to minimize the risk of infection, many institutions moved to telepsychiatry for outpatient appointments. However, in inpatient settings, telepsychiatry care may not be available, which requires additional precautions to protect trainees and patients, testing for COVID-19 prior to admissions, transitioning family meetings to videoconferencing. The transformation to telepsychiatry requires training and flexibility from physicians and trainees, especially that many practitioners and patients complain of the loss of the human connection relative to in-person contact (Richards, 2020). Besides clinical adjustments, most psychiatry training programmes transitioned to remote learning to maintain teaching and ensure that trainees reach the competencies necessary to practice psychiatry (Chick, 2020).

At the Lebanese American University of Beirut, the postgraduate psychiatry programme is based on the ACGME-I requirements (ACGME-I, 2020). The Accreditation Council for Graduate Medical Education International (ACGME-I) delineated core competencies specific to the practice of psychiatry and delineated knowledge, skills and attitudes related to where knowledge, skills and attitudes should be reached: Patient care, medical knowledge, practice-Based Learning and Improvement, interpersonal and communication skills, professionalism, systems-based practice. The developmental trajectories in each of the competencies are articulated through the Milestones assessment (Edgard, 2020). This assessment tool provides a framework for assessing behaviours or qualities associated with a graduate's development as a physician (The Psychiatry Milestone Project, 2015).

The main training site for psychiatry in Lebanon is the Psychiatric Hospital of The Cross which has a capacity of 1000 beds. Trainees have an opportunity to learn by encountering a wide variety of patients, disorders, cultures and the chance to take responsibilities and being

autonomous. However, the workload and the limited time frame as well as the lack of motivation and engagement of senior clinicians have led to poor supervision, as reported by the complaints of the trainees themselves. Although tacit and informal knowledge may be - consciously or unconsciously- beneficial, there is a lack of a structured, well organised, formal education (Fernandez et al, 2020). In addition, even if the trainees feel empowered by taking decisions, they may lack skills required by the ACGME to fulfil the core competencies and learning outcomes.

The emergence of the pandemic of COVID-19 was an unexpected event. The hospital had to close its doors to new admissions in order to protect chronic patients who are more vulnerable and because the hospital was not able to provide the necessary equipment and material to ensure patients' safety nor to secure enough personnel for a close monitoring of hygiene and social distancing. Under these circumstances, trainees had to suspend their inpatient training, their activities being reduced to outpatient consultations and some online lectures. Furthermore, travel restrictions and closure of international borders to mitigate the outbreak complicated the situation even further.

More recently, the dramatic explosion that devastated Beirut (August 4th 2020) exacerbated the feeling of insecurity and unpredictability of the future. The main hospitals of the capital were totally or partially destroyed, reducing furthermore the possibility of an adequate training with achievement of the required competencies.

In light of these circumstances, the problem under study is how best develop a response to crises so as that education and training are sustainable, even if trainees are required for medical response to crisis.

Aim of the study

Given these unforeseen events, there is a necessity to develop a model of education adapted to crisis in order to keep the psychiatry trainees engaged in the curriculum and allow them to graduate after mastering the expected essential competencies. The aim of the study will be to identify the training problems psychiatric trainees are facing and that the crisis has exacerbated, try to define trainees' needs and plan solutions to keep them training and learning as the crisis persists. Finally, we will implement and manage the proposed training interventions using an action research process to evaluate and reflect on the changes.

Project research questions

The project will answer the following questions:

Given the situation of healthcare, social, political and economic crisis in Lebanon:

1. What are the problems that psychiatry trainees are encountering during their training and have these been exacerbated by the pandemic?
2. What are the solutions to achieve the learning outcomes related to the required core competencies of the ACGME?
3. What are the challenges and pathways of implementing the required changes and what are the effects of these changes on trainees' engagement?

LITERATURE REVIEW

A literature review, following the principles of scientific methods, aiming at synthesizing the best available evidence in relation to the suggested research topic was performed to be able to provide informative and evidence-based research (Boland, 2021). We searched for topics related to remote learning in period of crisis and covid pandemic, and retained articles related to psychiatry e-training during the outbreak or in a disaster setting.

Search strategy

A comprehensive search of the following electronic databases was conducted: MEDLINE, PUBMED, CINHALL, PsychINFO, Scopus, ERIC, Google scholar (Figure 1). An experienced research librarian helped in designing search queries. Primary terms with synonyms and Boolean operators and truncations such as: blended learning, e-learning, remote learning, virtual education, residency programme, graduate education, postgraduate, trainees, psychiatry education, pandemic, crisis, disaster, engagement, middle income, low-income countries, COVID-19, SARS-CoV-2 (Appendix A).

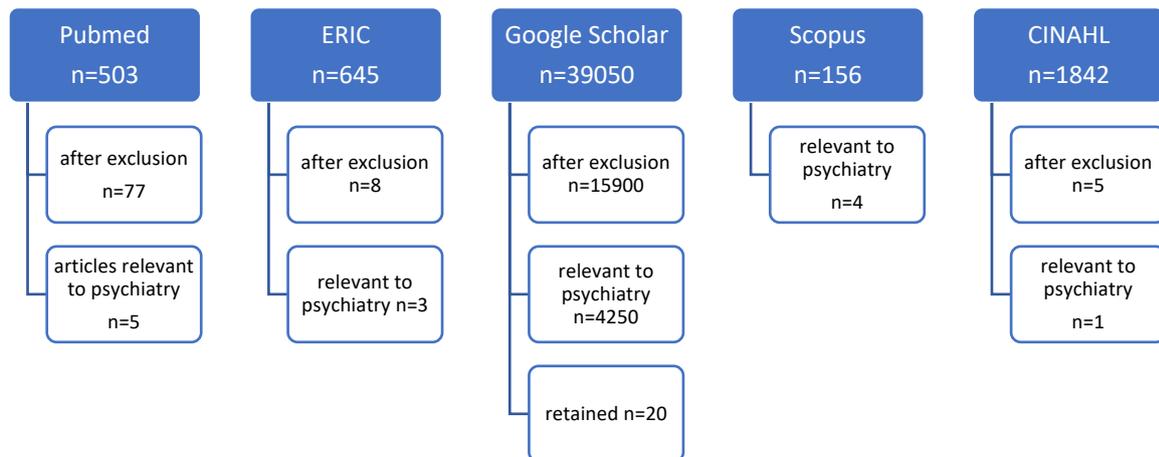
The citations identified through the search were imported into Zotero reference manager. Snowballing and hand-search of full articles were undertaken and included when eligible. Reference lists of relevant manuscripts were searched for additional literature. Theses or conference abstracts appearing in the reference lists were included if eligible. All articles in English or French were included, with no limit of date.

Inclusion and exclusion criteria

For the purpose of the study, selection was limited to postgraduate medical education. Articles related to undergraduate medical education were excluded. Because of the paucity of articles related to psychiatry interventions in period of crisis, all types of articles were included.

After screening for duplicates in databases, articles were selected and reviewed. After reading all the abstracts in all databases we narrowed the research to psychiatry training, and chose the relevant articles which we found relevant to our research study (Appendix B).

Figure 1. Flow-diagram of search strategy



A. History and definitions of distance education and e-learning

Early attempts concerning distance education began with education through letters in the 1800s, backed by radio and tape recorders in the first half of the 1900s (Ösçelik *et al*, 2020). With the fast advancement in technologies of television, video and computer communication systems, the application of distance education changed considerably. At present the concepts of online education/web-based education or e-learning took over the term “distance education” (Ösçelik *et al*, 2020). E-learning may be defined as “an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new knowledge, skills and/or behaviour/attitude” (Sangra *et al*, 2012). E-learning can be synchronous (simultaneous), allowing online systems to mimic classroom interactions, or asynchronous (non-simultaneous) facilitating self-paced learning (Ehlers, 2006), or mixed involving both methods. E-learning technologies offer learners flexible learning environments with no boundaries for time and place (Crosky *et al.*, 2010), allowing them to accommodate their learning objectives, by controlling content and pace of the learning (Ösçelik *et a.*, 2020). Remote learning also facilitates communication between teachers and learners, permits interaction with visual and audio applications provided by computer technology and gives learners the opportunity to benefit from lifelong education and training activities (Ösçelik *et al*, 2020). The learning process may be more egalitarian by allowing learners to contribute directly to content development and foster engagement with a social community of learners (George and Dellasaga, 2011). Synchronous interaction can promote collaboration skills and offers “greater opportunity for education than taking satellite courses or streaming courses through Internet” (Stewart *et al*, 2011).

B. E-learning efficacy

According to studies, students consider e-learning at least as effective as and a complement to traditional learning (Ruiz, 2006). In postgraduate education, computer-based teaching and learning were viewed as effective as typical lecture-based teaching sessions (Davis, 2007).

Studies comparing e-learning with non-internet instructional methods are heterogeneous and suggest comparable effectiveness to traditional methods (Cook, 2010). However, the authors underscored that efficacy should be considered within a given course and context and correlates with learners' disposition and course design rather than technology by itself. Likewise, the authors of a meta-analysis and comprehensive review comparing online with alternative methods for training health professional in providing clinical intervention, found similar outcomes pertaining to knowledge and clinical behaviour (Richmond, 2017). In another study, learners considered e-learning as efficient as traditional clinical skills teaching and recognized its combination in a mixed approach (Gormley, 2009).

Learning technique should be adapted to the desired outcomes. E-learning is suitable for virtual clinical cases and for updating medical knowledge (Gensichen *et al*, 2009). Learning preferences may require the combination of different teaching modalities and offers new training opportunities (Gensichen *et al*, 2009). A problem-based learning research found that an online interaction is an acceptable alternative to traditional group instruction (Robson, 2009). In another study, 25% of higher education students in the USA, who enrolled one or more online courses in 2008, preferred face-to-face contact (Stewart, 2011). Dror *et al*. suggest that it is prejudicial to the learning experience to convert material destined to face-to-face presentation to an electronic format (Dror *et al*, 2011). Teamwork and technical skills can be promoted by simulations (Cook *et al*, 2010). "In situ simulation", a technique that integrates simulation in a real workplace environment, can facilitate learning transfer (Rosen *et al*, 2012).

E-learning could be more cost-effective than traditional lecture-based learning (Cook *et al*, 2010). However, it is strongly recommended to use a blended approach learning, combining e-learning with other training modalities such as face-to-face teaching, which can affect cost-effectiveness (Sanders, 2011). This is not clear how e-learning can provide best effect, even in well-designed resources, as learners may make inconsistent use of them, and thus resources may not be used as intended (Khogali *et al*, 2011).

E-learning offers greater opportunities to learners as well as fostering faculty efficiency. Medical educators are confronted to several challenges, including the promotion of self-regulated learning, flexible learning opportunities with constant availability and encouraging engagement of learners in pursuing continuous development (Lewis *et al*, 2014). However, the ability for an e-learning education necessitates a minimum of institutional equipment in human and infrastructural resources that may not be available in low-and middle- income developing countries. New tools should be adjusted to the educational and economic context to allow adequate adoption of institutional e-learning (Frehywot *et al*, 2013).

In order to be successful, e-learning programmes should benefit from institutional characteristics, such as organisational support with time allocated for learning, supportive learning environment and information technology support as well as access to internet. Individual factors for success include motivation, positive attitudes toward e-learning and digital literacy (Ruggeri, 2013).

In summary, e-learning is not just a transmission of documents in an electronic format (Ellaway, 2008). Online learning strives to be a pedagogical flexible technique, learner-centered, fostering engagement, interaction, collaboration and communication (Ellaway, 2008). The principal actor in online learning is the e-learner, whose needs may be different from teachers' perception and construction of teaching content and activities. Thus e-teaching

may be different from e-learning and it is important to develop teachers' professional skills using online media (Ellaway, 2008).

C. Theoretical grounding for e-learning

There is not a single learning theory for instruction in general, and for online education in particular (Picciano, 2017). Most of the theories derive from the major learning theories such as behaviourism, cognitivism and social constructivism. In the following section, several theories will be examined in terms of their adequacy for the online environment.

1. Learning processes

Two metaphors for learning have been described, "acquisition" and "satisfaction" (Sfard, 1998). The acquisition model emphasises an individual's attainment of knowledge while the participation model of learning focuses on the bonds between individuals. Learning is considered as an ongoing process of belonging and not isolated from context. Learners need both acquisition of knowledge and participation in learning processes. The place of acquisition in learning development should not be ignored. Participation relates to the notion of "communities of practice" from the work of Lave and Wenger (Lave and Wenger 1991) relevant to trainees' learning in the workplace. According to Lave and Wenger, to become a member of the community, learners need to participate in the community, in addition to the acquisition of technical, knowledge or skills in performing tasks. Participation allows trainees to learn about the values, shared knowledge and practices of the community, which creates a shared sense of enterprise and identity. At first, the trainee enters the community and learns at the periphery, immersing in "legitimate peripheral participation". With the improvement of

their competence, they move toward the “centre” of the community. Learning is thus both about the acquisition of Knowledge and also a process of social participation. Hence, technology should be used to improve social processes as well as to deliver subject content (Dexter and Dornan, 2010).

2. Forms of knowledge and knowledge transfer

The capacity of technology to enhance learning depends on the nature of knowledge. There are two types of knowledge: explicit and implicit. Explicit knowledge is codified and can be expressed in clear statements, whereas implicit knowledge is learnt through observation, imitation and practice (Bullock and de Jong, 2014). The medical practitioner needs both. Understanding the place of both in medical education may assist educators in determining their use of technology to enhance learning.

3. Adult learner and reflective practice

Malcolm Knowles identified motivations and learning preferences of adults and developed an array of principles for adult learning (Knowles, 1984). The capacity of technology to foster learning should be connected to educational theory. A fundamental part of the learning process is reflection, through which learners can understand their educational experience, whether a lecture or simulation lab, or a clinical setting. Reflection allows learners to assimilate, reorganise and insert knowledge. It is a repetitive process that enables new knowledge to be analysed and acted upon and emphasizes the engagement of learners and their prior knowledge

and experience (Kolb, 1984). When considering technology, reflection should be considered even if it is on an individual basis (Delany and Molloy, 2009).

D. E-Learning and learning theories

Technologies available in medical education are multiple and their use should take into consideration the design of how a learning experience can be promoted in order to meet the intended learning outcomes (Zakharias, 2009).

There are a diversity of learning theories and e-learning has been related to a theoretical framework or learning theory (Ellaway, 2008). These theories are important as they can impact the design of educational technology (Sandars, 2015). Normative educational theories are involved with the aims of the design. Descriptive educational theories consider the process of learning and involves cognitive, social and contextual aspects of learning (Sandars, 2015).

1. Normative educational theories

Normative educational theories provide a guidance on the aims of the design and answer the essential question of the type of learner the design is intended to develop, based on John's Dewey learning theory. John Dewey, a pragmatist philosopher, believed that human beings learn by experience, a "hands-on" approach. This approach to education is learner-centred and based on the learner's need. The strive for learning is self-inquiry or reflection and the need of individual to make sense of the world (Dewey, 1943). Teachers act as facilitators to foster the

process. Dewey's philosophy can serve as a guidance to design educational interventions with technology (Sandars, 2015).

2. Cognitive educational theories

Among theories which are considered compatible and adequately designed for e-learning is the constructivist theory, founded by Jean Piaget (De Leeuw *et al*, 2016). According to Piaget, humans are active learners and build new knowledge based on previous experiences and interactions. Two theories, cognitive load theory and multimedia learning, are based on the constructivist approach and were adapted for e-learning.

The underpinning of cognitive-load theory is the human cognitive architecture, which involves working memory of limited capacity and long-term memory with unlimited ability (Sweller, 1988). Knowledge is organized in schemas that are kept in long-term memory and leads to expertise. Repetition of tasks facilitates the development of automated schemas that will be processed in working memory with no limitation (Merrienboër and Sweller, 2010). During a problem-solving situation, new elements will be added to the previous knowledge and incorporated in already existing schemas, leading to the development of new schemas. Repetition of these schemas drive the establishment of automated schemas. Cognitive load theory targets the capacity to adapt to the processing of information in working memory to build new schemas (Krishner et al, 2011). Three types of cognitive load may influence the process :

- Intrinsic load which depends on the nature of the material itself. When the material

consists of multiple interacting elements of information, the intrinsic cognitive load will be high and learners therefore experience it as difficult (sweller, 1994),

- External load which relates to the way information is presented, and
- The germane load, learning that emerges through intrinsic load (Merrienboër and Sweller, 2010).

To optimize learning, extraneous load should be minimized, instructional design germane and the association between cognitive load and learning best (Krishner *et al*, 2011). However, many factors may impede this expansion, such as learners' prior knowledge, interactivity between elements, motivation of learners to invest mental effort to process information and build new schema and automation . Thus, instructional design, particularly in e-learning environment, should be adapted to students' needs and levels of expertise.

The cognitive Theory of Multimedia Learning, developed by Mayer, states that thorough learning arises from words and pictures rather than from word alone (Mayer, 2001). Nevertheless, reaching multimedia learning requests more than simply adding words to pictures. The objective is instructional media with relation to the human working mind. Analogous to Cognitive Load Theory, the theory suggests that, in multimedia learning, two separate channels, auditory and visual channels process the information separately, each of them with limited capacity. Furthermore, learning is an active process through selection, organisation and integration of information based on prior knowledge. Similar to cognitive load theory, Mayer discusses the three types of human memory and presents the idea that a multimedia presentation of terms, images or auditory information is not interpreted in a mutually exclusive fashion. Rather, the brain selects and organises these elements dynamically to build logical mental constructs. In addition, Mayer highlights the importance of learning when new information is integrated with prior knowledge.

3. Social educational theories

Adult learning theory stipulates that adults learn when they correlate new learning to past experiences, identify their specific learning needs, and when they apply learning, which leads to more effective and efficient learning experiences (Ruiz, 2006). Improving learning allows learners to be more interactive (collaborative learning) and more efficient, enhances their motivation, cognitive effectiveness and promotes flexibility of learning style. A well-designed e-learning experience authorizes learners to be more active participants and can motivate them to be more engaged with the content (Clark *et al*, 2002). Interactive learning offers a stronger learning stimulus, switching attention from a passive teacher-centered model to an active, learner-centered one. Interaction aids sustaining learners' interest and supports individual practice and reinforcement. Learners may gain knowledge, skills and attitudes faster than in traditional methods, which could translate into better motivation and performance. E-learners have shown increased retention of knowledge, skills and attitudes. They can also choose among media options to accommodate their learning style (Clark *et al*, 2002).

The surge of new social media has led to new theories of learning such as connectivism, developed by Siemens. According to Siemens, learning is a network phenomenon, influenced by technology and socialization (Siemens, 2006). Learners connect and participate in a learning community within which knowledge is activated. Through network connections, links between learners and content can be very rich. Although criticized for its lack of direction, the lack of educators' role and difficulty with assessment, connectivism may provide an effective lens through which teaching and learning using technology can be better understood and managed (Goldie, 2016).

4. Situativity educational theory

Situated theory suggests that knowledge, thinking and learning are situated in experience and cannot be separated from their context (Durning, 2011). Learning occurs with a dynamic interaction between individuals and their environment (Durning, 2011). Situativity theory encompasses situated cognition, ecological psychology and distributed cognition. Situated cognition identifies a complex interaction between learner and the environment and acknowledges equal importance of both components. Ecological psychology views learning and cognition as a goal-driven interplay between participants and environment, which can explain how people interact. Distributed cognition underscores the social setting and the way social interactions engender thinking and learning. These perspectives can promote authentic learning experiences when using technology by emphasizing the complexity of the workplace in designing teaching or learning endeavours (Sandars, 2015).

5. Community of inquiry

The “community of inquiry” model for online learning environments distinguishes three “presences”: cognitive, social, and teaching (Garrison *et al*, 2000), which are interconnected. Teachers and learners share thoughts, information and opinions, creating active learning environments or communities, through the design of online or blended courses. “Presence” is viewed as a social phenomenon that arises through interactions among students and instructors. The community of inquiry has turned out to be one of the most popular models for online and blended courses that are devised to be greatly reciprocal among learners and faculty employing discussion boards, blogs, wikis, and videoconferencing.

6. Online collaborative learning (OCL)

The online collaborative learning theory pinpoints the convenience of Internet use to support learning environments in enhancing collaboration and knowledge building (Harasim, 2012). In OCL, knowledge construction happens through three phases: generation of ideas where disparate thoughts are brought together, organisation of ideas through discussion and exchange, where thoughts are collated, examined and classified, and intellectual convergence with emergence of synthesis and consensus, by means of an assignment, essay, or other joint piece of work.

OCL also stems from social constructivism. Learners are invited to collaborate and solve problems through discussion. The teacher contributes as a facilitator besides being a learning community member. OCL meets with other constructivist theories where the instructor is not detached, but an active facilitator of knowledge building. OCL fits best in small instructional environments and becomes progressively valuable when looking for similarities among online education theories.

7. Integrated model for online learning

In a review of instructional technology, Bosch identified and compared four blended learning models that underlines the integration of pedagogy and technology in course design, and developed a Blending with Pedagogical Purpose Model (Picciano, 2017). In this model, approaches such as online technology used by faculty members, are guided by pedagogical objectives and activities. In addition, combining multiple modalities to encompass objectives, activities, and approaches, might be most effective and interesting for a wide range of students. The model involves six basic pedagogical goals and approaches for achieving them, to develop

learning modules. The modules may or may not overlap, depending on the approach used. The model is adaptable and considers the addition of other modules as needed and where appropriate. The essential characteristic of this model is that pedagogy propels the approaches that will function best to strengthen student learning. Finally, all the modules used blend together into a coherent whole.

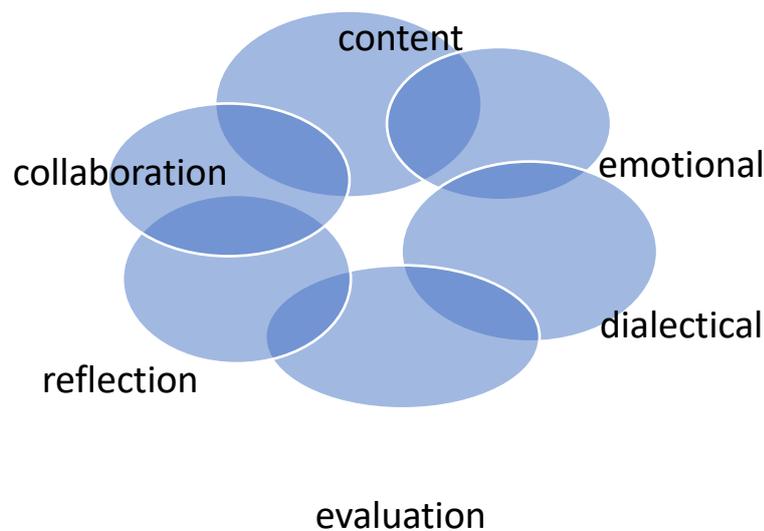


Figure 2. Blending with Pedagogical Purpose Model

The modules should include:

- Content, which can be delivered and presented in many ways (Audio, video, text)
- Social and emotional support
- Dialectics or questioning, which helps teachers probe what learners know and help refine their knowledge
- Reflection: Students can reflect on what they learn and share their reflections with their teachers and peers
- Collaborative learning: as a technique for group problem solving.

- Evaluation of learning: through papers, tests, assignments, and portfolios

The six elements of the model shape an integrated community of learning where strong interplay, whether online or face-to-face, can be supplied and blended across all modules. Moreover, only some of the activities and approaches may be incorporated in a course. The pedagogical objectives of a course drive the activities and, hence, the approaches.

Summary of distance educational theories

Clarifying the educational theories related to the design of interventions using technology helps understanding how a particular intervention with technology works rather than verifying if it is effective or not (Cook *et al*, 2009). The fundamental component of realist evaluation is understanding how, why and in what circumstances an internet-based medical education works (Pawson *et al*, 1997). A realist review of the use of technology in medical education, conducted by Wong and al. did not identify the specific educational theories that the developers had used to inform the design of their interventions (Wong *et al*, 2010). When using technology in medical education, it is important to identify the underpinning learning theories to ensure that the design of the intervention was appropriate for its intended outcome and adequate for promoting learning (Donaldson, 2012). Each encounter requires different types of knowledge, learning, and contexts. Online educators and students should be skilled and cognisant to choose the best combination of both pedagogy and technology (Anderson *et al*, 2011). The development of relationships among teacher, learner and content builds up from the crucial task of student–student interaction in constructivism to the student–content correlation highlighted in connectivist pedagogies, which concentrate on persistent networks and content brought about by the user. The community-of-inquiry model, which emphasises building and sustaining cognitive, social, and teaching presence, may help in selecting appropriate

pedagogies. Table1 summarises these characteristics and presents an outline and examples of both similarities and differences among them.

Table 1. Summary of Distance Education Pedagogies (constructed from Three Generations of Distance Education Pedagogy (Anderson and Dron)

Generation of distance education pedagogy	Technology	Learning activities	Learner granularity	Content granularity	Evaluation	Teacher role	Scalability
Cognitive-behaviourism	Mass media: Print, TV, radio, one-to-one communication	Read and watch	Individual	Fine: scripted and designed from the ground up	Recall	Content creator, sage on the stage	High
Constructivism	Conferencing (audio, video, and Web), many-to-many communication	Discuss, create, construct	Group	Medium: scaffolded and arranged, teacher-guided	Synthesize: essays	Discussion leader, guide on the side	Low
Connectivism	Web 2.0: Social networks, aggregation & recommender systems	Explore, connect, create, and evaluate	Network	Coarse: mainly at object and person level, self-created	Artifact creation	Critical friend, co-traveler	Medium

A well-balanced educational experience involves cognitive-behaviourism, constructivism and connectivism. Connectivism is based on a constructivist model of learning. The centre is the learner who connects and builds knowledge through external networks and groups and according to the learner's histories and preferences. Both constructivist and connectivist approaches rely on the availability of the material of learning, much of which is designed and

organised on cognitive-behavioural models. The efficacy of the Web sites, books, tutorial materials, videos, from which a learner may learn, depends on their ability to help learner gain knowledge. Even when learning happens during social interactions, learners may communicate knowledge more or less effectively. The learner may be in the heart or involved in a learning community or learning network. The detailed application of comprehension on how humans can learn more effectively can foster learning effectiveness. Cognitivist, behaviourist, constructivist, and connectivist theories are all involved in learning process (Anderson, 2011).

E.E-learning and psychiatry

The ACGME-I signals that psychiatry trainees should use information technology to optimize learning (ACGME-I, 2016). Psychiatry education has adopted telemedicine based educational programmes or video-conferencing as early as 1956 (Wittson *et al*, 1957). At present, advances in technology authorise synchronous videoconference with live interaction between presenters and attendees (Curran, 2006). Telepsychiatry involves providing services to patients, psychiatric evaluation, follow-up care including therapy and medication, as well as psychoeducation (Richards, 2020). Tele-psychiatry is a helpful supplement to traditional education and gives a chance to trainees who are unable to be physically present to take part in the event. Videoconference-based education can involve a large array of activities such as journal clubs, ward rounds, continuing and formal medical education (Klein, 2005). In the context of patient care, previous studies have shown identical benefit and patient satisfaction from in person consultation and remote consultation (O'Reilly, 2007). Although there was an interest in telepsychiatry education within residency programmes, however a small number of residency programmes have formal, longitudinal telepsychiatry curriculums (Saeed, 2016). The ACGME does not specify prerequisites regarding telemedicine in psychiatry training

requirements, but suggests that exposure to telepsychiatry during training may increase trainees competence in using this technique after graduation (ACGME, 2019).

1. COVID-19 and psychiatry training

COVID-19 pandemic was an unforeseen change and possibly will be the new “normal” in healthcare (Katato, 2020). The pandemic could be a catalyst for adjustment not only for trainees but also the healthcare system as a whole (Richards, 2020). Most of psychiatry training programmes have transitioned to remote learning together with the clinical adaptations to reduce COVID-19 spread (Richards, 2020). Maintaining high-quality teaching is essential, not only to meet ACGME milestones requirements but also to guarantee the fulfillment of a rich knowledge base needed to practice psychiatry (Chick, 2020).

2. Telepsychiatry

Telepsychiatry can be defined as the use of technology to provide mental health services remotely, including psychiatric assessment, medical management, psychotherapy and psychoeducation (O’Reilly *et al*, 2007). In order to reduce the risk of virus transmission, many institutions shifted to telepsychiatry, especially in the outpatient settings. Exposure to telepsychiatry during training years may increase the probability to pursue this method of care later on (Teshima, 2016). However, there is no formal training for telepsychiatry, resulting in hesitancy in its adoption. In addition, clinicians may perceive difficulty in establishing relationships with their patients through telepsychiatry. In addition, face-to-face communication and video conferencing may differ in quality and depth (Fortney, 2015). The

evidence that telepsychiatry is equivalent to in-person treatment is limited to psychiatric consultations and needs more support to other forms of face-to-face treatments (O'Reilly, 2007). Adopting telepsychiatry in a curriculum necessitates rigorous educational needs assessments (Crawford, 2016).

3. Remote learning

Some faculty had difficulty in adapting to remote learning. Programme directors supplemented online lessons with online modules to avoid disruption of the educational training (Nutritional Neuroscience curriculum Initiative, 2015). The designers of the curriculum showed that it was possible to apply desirable active learning principles when using remote learning along with expanding trainees knowledge in essential topics in psychiatry. Videoconferencing was successful in protecting areas of education in addition to didactics, as well as guidance for psychotherapy, pharmacotherapy and process groups (Richards, 2020).

There is a scarce literature regarding the impact of the pandemic on training psychiatrists and child and adolescent training. Adjustments in the areas of telemedicine, remote learning and training wellbeing have been anecdotally described (Deschamps *et al*, 2021). Most of the studies reveal a rapid shift toward e-learning via platforms such as Zoom or Teams or switch to telepsychiatry for patient care. (Mark *et al*, 2020) The increasing use of digital tools allowed trainees who worked in rural and deprived areas to maintain their training (Deschamps *et al*, 2021). An increase in training modules and blended learning has been observed. According to a feedback received by the European Federation of Psychiatry Training, the replacement of a face-to-face training and in-person conferences with online sessions has sometimes led to a reduction in the quality of training. Group learning and support were threatened (Heldt *et al*, 2021). These reports were aligned with a study among psychiatry trainees and faculty who grasped in-person learning more positively than remote learning in relation with enjoyment,

connection and concentration (Heldt *et al*, 2021). A threat to research training in child and adolescent psychiatry was also observed, due to suspension of many clinical studies and priority was given to the consequences of the pandemic.

Mark and al. discussed the way to run a journal club in an online environment. Journal clubs were run on a weekly basis using a virtual platform followed by a discussion on a WhatsApp group. The number of participants was higher than in face-to-face meetings, engagement of participants was difficult to measure and the social aspect was missing (Mark *et al.*, 2020). The authors conclude that journal clubs are substantial in psychiatry training as they offer a chance to develop critical thinking, critical assessment and presenting skills and structured discussion. Moreover, when considering journal clubs, adequate techniques are necessary for effective engagement. The authors advise considering learners' needs and preferences and helping in establishing a friendly approach, a facilitating discussion and collaboration.

In a review of the role of digital learning in addiction psychiatry, technology was found to have several advantages among which ease of access, reachability, time saving, cost-effectiveness, self-paced learning (Bairy *et al.*, 2019). In their review, Bairy and al. discussed different online technologies such as Massive Open Online Courses (MOOC), E-learning, virtual reality, simulation, flipped classrooms, blended or hybrid learning. They concluded that engagement of learners was the major challenge in digital learning. Ambivalent feelings about technology may be responsible for the delay in embracing a technology curriculum.

Five months after a first report on the initial impact of COVI-19, Kimberly Best and al. evaluated the changes that occurred in psychodynamic psychiatric teaching and practice. They noted that virtual treatments led to a loss of effectiveness or disinterest in immediate psychodynamic orientation, given the practical needs patients may encounter. Nevertheless,

tools of digitally-based communication have been adopted, although with reservation, and virtual training and treatment have become unavoidable and satisfactory (Best, 2020).

In an article designing the development of a sustainable e-learning ecosystem, Hategan et al. suggested a shared curriculum model. They constructed modules with clear learning objectives in alignment with core competencies. The instructional design was prioritized and inculcated with engaging case-based activities and content-specific clinical instruction was set to help trainees in their deliberate learning. Mayer's cognitive theory of multimedia learning served as a reference to develop case studies. The authors suggest that collaboration in the creation of a shared content-specific curriculum allows the diffusion of best knowledge-based principles and practices, permits blended learning. Instructor-led training may complete self-directed learning of asynchronous e-modules (Hategan *et al.*, 2020). In echo with Regmi and Jones, the authors identified enablers affecting e-learning. Online technique can facilitate learning, foster learning through interactive case, apply systematic approach to learning and underscores integration of e-learning in curricula (Regmi and Jones, 2020).

On the other hand, barriers to e-learning implementation should be pointed out. Learners may lack motivation or engagement, particularly when the design is deficient (Regmi and Jones, 2020). High-quality, multimedia abundant e-learning is resource intensive and time consuming. Asynchronous e-learning may not be suitable for all contents and information technology may be deficient. Besides, some educators may also refuse to share their material.

E-learning should outperform the transmission of inside information in order to address skills and behaviours and enable the application of knowledge and skills. In addition to the paucity of articles related to e-learning in psychiatry training programmes, and although online learning seems to be as effective as traditional methods of learning, there is a limited evidence of determining how e-learning can best foster learning and factors associated with it (Cook *et al.*,

2008). Most of the studies are essentially descriptive, fail to show outcome measures and lack design appropriateness (Kim, 2006).

METHODOLOGY

A. Action research framework

An action research method, used as a dynamic process of professional learning for clinical educators in primary and secondary education, was applied (Delany, 2014). Action research has its roots in the social activism of the mid 20th century. A systematic process is used to solve educational problems and make improvements. Relevant interventions are employed to collect and analyse data and then implement actions to address educational problems (Tomal, 2003). The fundamental principles of action research lie on discussing real problems with the intention of improvement and empowerment (Dewar and Sharp, 2006). In action research, participants engage in a structured process of reflection and development happens through sequential cycles of planning a change, implementing while observing the process and reflecting on the consequences of the change (Ng, 2014). Collaboration between participants and researchers helps constructing the results of the research and implementing social change. The action research framework is appropriate in our study because we recognize the existence of shortcomings in educational activities in a crisis situation and would like to explore an introductory perspective corresponding to the problem, develop a plan, implement an intervention, evaluate the outcomes and work out further strategies in a repetitive fashion (Hopkins, 1993).

The action research cycle may be viewed as a learning process (Kolbe, 1984). Trainees can learn and create knowledge by a critical reflection on actions and experiences, shaping of abstract concepts and evaluation of their implications in new situations. Instructors can

construct their own knowledge and recognition of a situation and take action, promoting by that knowledge and application in work situation.

B. Participants

The study took place at the “Psychiatric Hospital of the Cross” (PHC). With over 1000 beds, PHC is the largest psychiatric hospital in Lebanon and the middle east region, and delivers comprehensive mental health care. The Lebanese American University postgraduate psychiatry programme was launched three years ago and currently involves three trainees of different levels each, scaling from first, second and third year of postgraduate training. The main site of training takes place in PHC. In order to have a representative sample, psychiatry trainees from other universities, training at the hospital as a primary site, were included in the study. The same programme was applied to all trainees at the hospital with unified learning objectives. In all, a purposive sample of eight postgraduate trainees, two women and six men agreed to take part in the study. Due to the small size sample, trainees from different levels of training were recruited. Written informed consent was obtained and all relevant information about the project was communicated. Confidentiality was respected and identity of the participants protected, keeping in mind that the small number might mean complete confidentiality was difficult. Three programme directors, including the main investigator, gave their consent and were willing to be part of the study and to collaborate with the participants through an iterative process of reflection in action and reflection on action. They reviewed all the data collection, the coding process and discussed the areas of disagreement and clarified different perspectives.

Approval from Ethical Committee of PHC as well as approval from programme directors of the different universities and from Keele University School of Medicine were gained.

C. Research design

The study design followed the classical cycles of action research and involved three stages.

During the first stage, meeting with educators was performed to reflect upon the trainees' educational needs in this period of crisis. Data collection using a semi-structured interview with trainees was done to assess their needs, followed by data analysis. In the second stage, we developed and implemented the teaching methods according to the results of the data analysis. The third stage consisted of a reflection on the action implemented. At this stage, we performed further data collection by sending a survey to the learners and results were analysed in order to further ameliorate and refine the cycle. The detailed methods of the three stages will be presented in the next section.

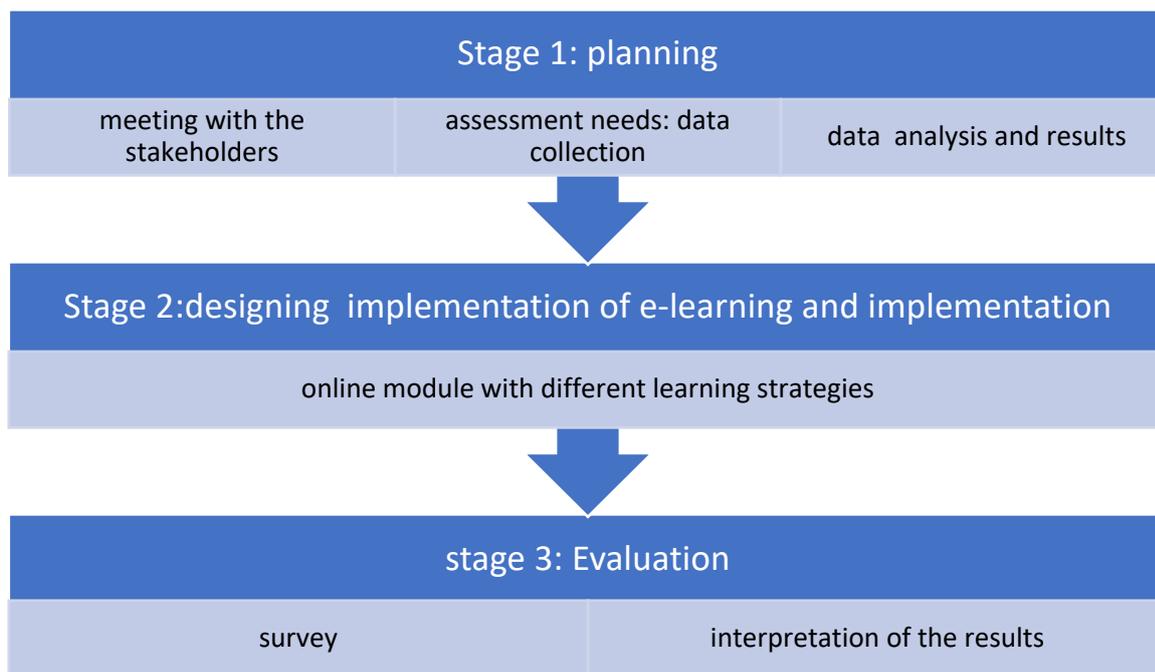


Figure 2: the process of the action research

D. Procedure

D.1. Stage 1: planning

D.1.1 Methods

- **Meeting with the stakeholders**

A first meeting with the programme directors was performed to understand the problems and complaints of trainees with regards to their training and education at the hospital and evaluate the impact of the pandemic on the aggravation of these problems. The goal of the meeting was to develop a clear vision of learners' needs. There was a unanimous agreement of the lack of time dedicated to formal teaching and supervision, due to workload, as well as a deficiency in a structured curriculum with defined learning objectives and outcomes. With the rise of the pandemic, there was a dire reduction in the workflow, which impacted even more negatively the students. A pressured need emerged from the meeting to keep the training on track and enhance engagement of trainees by switching rapidly into an online curriculum, the content and design of which will be planned according to trainees needs assessment. To reduce impact of power differentials and favour trainees' expression of their own perspective, meetings with programme directors were held separately. However, the same semi-structured questioning process was used for both groups.

- **Needs assessment**

- a. **Semi-structured interviews**

We performed a targeted needs assessment by interviewing trainees on a one-on-one basis. The targeted needs assessment permits the proper framing of the problem and allows the involvement of all stakeholders in the process of identifying solutions. It is the first step to

engage and motivate trainees in their own education (Hughes, 2016). In addition, needs assessment is able to coordinate resources with strategy, develop connection among participants, clarify problems or opportunities, indicate the degree of need for further development, set objectives for future action, and provide data, discernment or rationale for decision taking.

A semi-structured one-to-one interview with every participant was conducted. A private location was chosen by the interviewees so that they can feel comfortable. Due to COVID constraints, video calls were performed for practical purposes.

In an effort to protect the identity of the participants, names and data were kept separately by using a code that was only accessible to the main researcher. Data was reported in a configuration that did not contribute to identification of individuals. Numbers were allocated for each name to protect the anonymity of participants. Data was stored securely on a password protected laptop held in a locked filed cabinet. Audio recordings were destroyed following transcription. All data will be destroyed within three months of terminating the study.

Individual interviews allowed participants express their perspectives and experiences on the training and communicate the problems and gaps they were facing. Open-ended questions about problems encountered before and extended , exacerbated or that emerged after the confinement and economic situation, the type of knowledge and skills gaps they are complaining of or struggling with, the elements that were the most affected by the crisis, the best methods to remediate to the negative impacts, the main topics they would like to focus on, the methods to integrate these topics in order to pursue the training , achieve their learning outcomes and reach their core competencies. The open-ended questions provided opportunities for the interviewer and the interviewee to discuss some topics in more detail (Hancock, 2009).

They helped trainees to participate and be active participants in the action research. Interviews were audio recorded. For further elaboration, the paraphrasing technique, which consists of putting in our own words what the interviewee stated, was used. This helped drawing out additional information from interviewees. A reflexive diary was kept, with field notes.

An in-depth interview provided a detailed exploration of the research question, the domains in need for improvement and the best methods to meet the objectives. Qualitative research interviews followed “semi-structured format”. It was guided by a predetermined set of open-ended questions but the trainee was free to pursue additional relevant topics as they rise. Interviews were audiotaped and later transcribed to facilitate analysis.

As part of the action research process, we had further discussions with trainees, explored issues at stakes, looked for conflicting perspectives, examined the level of consensus on issues, and double-checked with the participants to safeguard the impartiality of data, acting as a participant observer.

The ACGME competencies framework served as a basis for data analysis.

b. Data analysis

Qualitative data analysis is the action of working out a qualitative data set. It is a continuous process of reviewing, reflecting on and investigating the significance of the data as they are collected (Tomal, 2003). The first stage started with a verbatim transcription of the trainees’ interview.

The adoption of audio-recording and the use of transcript as well as the recording of circumstantial or reflective notes recorded helped becoming familiar with the whole interview. Then, the transcript was read line by line, assigning a label or code that illustrates

what was depicted as substantial. The aim of coding is to classify all the data in order to compare them systematically with other parts of the data set. Codes were grouped into categories or themes, constituting a working analytical framework. The working analytical framework is suitable for thematic analysis of textual data, specifically interview transcripts, where it is essential to be able to correlate and contrast data by themes across many cases (Gale, 2013). Transcripts were indexed using existing categories and themes, then data were charted consisting of headings and subheadings drawn during the thematic framework. The ultimate stage consisted of mapping and interpretation and included the analysis of the major features as outlined in the charts. A matrix was developed using a spreadsheet and data were laid out into the matrix. Laying out or charting comprised summarizing the data by category from each transcript. The chart included references to thought-provoking or describing quotations. Characteristics of and differences between the data were identified, investigating theoretical concepts or mapping connections between categories to analyse relationships or delve into the motives.

A separate note book was held to write down impressions, ideas and early interpretations of the data. Triangulation was used to increase the credibility and validity of our research finding through the convergence of information from both sources, educators and trainees. Data collected from meetings with the programme directors helped gaining clarification about the topics identified in the needs assessment phase as well as elucidating additional organisational issues and isolating specific development needs for teachers.

Participants were invited to state an opinion on the interview transcript and comment on the final themes and concepts created whether they adequately reflected the phenomena being scrutinised.

D.1.2. Results

Results were drawn from the interview of eight trainees, three from third year of training, three from year two, and two from year 1. Two major themes emerged from data analysis: clinical training and educational activities. The most significant results area presented in the following sections. Representative transcripts are shown in Appendix C.

Data analysis showed that training presented gaps in both clinical settings as well as educational activities. These issues existed before the pandemic and worsened with lockdown as well as the emergence of the economic crisis. Concerning clinical training, trainees admitted learning a lot from their workplace exposure in regular times, due to the huge load of patients and turnover:

“HPC is the only hospital where we can have a great load of patients “(postgraduate= PG) (PG II, A)

“Great exposure, with the opportunity to see chronic and social cases” (PG II, F)

“We can see two types of cases: emergency and non-emergency” (PG III, D)

However, there was a shortfall in clinical supervision, coaching, mentoring as well as case discussion about new admissions and clinical management. Furthermore, the lockdown imposed by the coronavirus compromised the exposure to inpatients and outpatient clinics (that were already limited):

“We lack outpatient clinics, and “liaison patients” (PG III, G)”

“Since the COVID pandemic, HPC closed, which had limited our exposure to psychiatric patients (PGII, A)”

As for educational activities, trainees denounced the dearth of a structured curriculum with little time allocated exclusively to education in general and requested to include modules, each module related to one subject in psychiatry and delivered through different modes such as journal clubs, case presentations and discussion as well as didactic lectures.

“Before the pandemic, we didn’t have enough time to focus on theories, having lectures and focusing on certain modules, basic sciences for example, which can help us have a more rounded clinical training (PG III, B)”

“For education, you can be an independent learner. But not enough. Having modules is a very good opportunity. The system must fix the minimum required (PG III, G)”

“The programme is not clear. We need to know about our learning objectives at the end of each year (PG I, E)”

“We need journal clubs as well as integrated modules (PG II, D)”

“Case discussions, lectures, journal clubs (PG I, H)”

The trainees also expressed their wish to prepare lectures by themselves to motivate them, foster leadership and peer teaching:

“Give the trainees responsibility to teach the students to teach them leadership and guide people around them (PG II, A)”

Another session with programme directors was held to discuss coded material, the themes that have been highlighted and reached consensus on overall data interpretation:

- Programme directors agreed on the lack of organization in the programme with regards to clinical training and educational activities. Since the hospital was closed, and lockdown was imposed, the priority for the educators was to sustain medical education.

- Programme directors suggested to start educational activities through Zoom platform in order to reinforce learning as soon as possible and with the resources that were immediately available.

- After reviewing the codings and themes that were pinpointed by the learners (table 2. Thematic framework), participants suggested to start with a specific module targeting a psychiatric topic. Subjects will be chosen with defined goals and objectives in order to promote clinical reasoning, integrate basic science, evidence-based medicine and treatment modalities. The strategies of delivery will be chosen depending on the goal and objective of every subject and the best way to deliver, with consideration of what was found in the coding process (journal clubs, case-based discussions, didactic lectures (table 2. Thematic framework).

- A mapping of core competencies that can be achieved with the activities was reviewed. The main core competency that came out was medical knowledge in addition to patient care and practice -based learning (ACGME-I guidebook).

Table 2. Stage I. Thematic framework (codes and themes)

Area	Code	themes	Mapping with core competencies
Challenges encountered during the training	<ul style="list-style-type: none"> • Lack of outpatient clinics • Lack of “liaison” psychiatry • Lack of exposure die to COVID and economic situation 	Clinical training (work-based learning): Human resources	<ul style="list-style-type: none"> - Patient care - Interpersonal and communication skills - Professionalism
	<ul style="list-style-type: none"> • Lack of bedside teaching • Lack of case discussions • Lack of review of medical records 	Clinical training: human resources	
	<ul style="list-style-type: none"> • Lack of mentorship • Lack of role model 	Clinical training: Human resources	
	<ul style="list-style-type: none"> • Lack of training peers • Lack of autonomy 	Clinical training: leadership	
	<ul style="list-style-type: none"> • Lack of time for teaching 	Clinical training: timing	
	<ul style="list-style-type: none"> • Lack of well-defined evidence-based approach 	Clinical training: context	
Challenges/needs	<ul style="list-style-type: none"> • Lack of theory teaching • Lack of basic sciences • Lack of lectures • Lack of modules • Lack of didactic lectures • Lack of journal clubs • Lack of case presentations and discussion 	Educational activities: Content Methods Timing Topics	<ul style="list-style-type: none"> - Medical knowledge - Practice-based learning and improvement - Patient care
	<ul style="list-style-type: none"> • Programme not clear • Evidence-based practice 	Curriculum design: Goals and objective competencies	

	<ul style="list-style-type: none"> • Assessment with constructive criticism 	Assessment methods: Formative summative
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D.2. Stage II: Designing the module and implementation

Following data analysis from interviews and identification of flaws (stage I), planning the administration of modules was developed using traditional design methods based on learning objectives and structured to link with psychiatry core competencies required by the ACGME-I (Seal, 2010). Steps in the design model included the learning needs that were found during coding, such as gaps in basic science, case discussions to foster critical thinking, and journal clubs for evidence-based medicine (Table 2. Codes and themes). The administration of the module was determined according to the best method available during the period of implementation, the preferences of trainees and the most appropriate method to reach the goal and objectives to the topic that was chosen. The use of different educational methods helps in presenting the information in different formats to accommodate learning preferences (Thomas, 2016), to maintain trainees' interest and provides opportunities for retrieval and reinforcement of learning, which stimulates deep learning, promote retention and enhance the application of what has been learned (Thomas, 2016). In addition, the use of different educational methods may ease the interpretation of several lower-level objectives, particularly in competency-based frameworks that attempt to reach complex objectives.

Content of the module was prepared, discussed and agreed upon with the trainees and programme directors.

The first module targeted mood disorders, as suggested by the trainees. Educational methods included didactic lectures delivered by the attendings, journal clubs presented by the trainees', case discussions retrieved from real life cases encountered in the hospital and which were complex and covered different domains such as ethical issues, as well as video cases with discussion followed by a lecture on the related theme. Videos included cases rarely seen during the training and which may be confusing in a clinical setting.

The module was spread out over two months, three times a week, excluding holidays. All the attendings of the hospital were invited to participate and deliver lectures to enable trainees to benefit from diverse approaches and different inputs from experts.

A Gantt chart was useful for planning each phase of the project with assigned schedules and times as well as a reflective diary.

Resource constraints limited implementation of the ideal approach in this step. We needed to consider faculty time, space, availability of material, costs as well as the availability of trainees' time.

The module ran from March 2021 to May 2021.

Module I. Mood disorders

Mapping template

<u>Students</u>	<u>Instructor</u>	<u>Active learning experience</u>
<u>Setting</u>	<u>Instructional method</u>	<u>Goals</u>

<u>Session title</u>	<u>Resources</u>	<u>Objectives: K,S,A</u>
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The intervention

Didactic lectures: Each lecture had a defined objective, integrating basic sciences, psychopathology, management in accordance to each trainee level of training.

Journal clubs and case-based discussions: Senior trainees, as well as juniors, were assigned preparation of subjects designed for their peers. This was engaging and challenging for trainees as they participate actively in the process of learning. Additional effort was required to learn the material as preparation for teaching, as well as practice with retrieval, which should reinforce retention and allows developing metacognitive skills. All trainees participated in the presentations, allowing new trainees to integrate new information as well as more advanced trainees to refresh their memory and learning about basic science in addition to developing their teaching skills.

Discussion helps learner to progress from a passive to an active role and also facilitates recovery of prior learned information in addition to building on new information (Thomas, 2016). We chose real life cases from the hospital, complex cases that incorporated many domains such as ethics and humanism. Cases were presented by the trainees who were in charge of the patient at the time of hospitalization. The attending who took in charge the patient played the role of a facilitator by setting up a supportive learning climate, assessing trainees' needs, and adequately using a mixture of interventions, such as maintaining focus, interrogating, generalizing and summarizing. Group discussion of cases allowed learners to dispose of new knowledge with faculty and peers and to recognise specific knowledge defects. Some cases were followed by a didactic lecture related to the case to enable knowledge

transmission and empower learners to integrate medical facts by applying higher-order cognitive skills.

Video files were used to present a lecture to demonstrate standardised techniques such as details related to history taking where the diagnosis seems confusing and not commonly observed at the hospital or the clinical settings. Videos offer to students the opportunity to immerse themselves into clinical scenarios and improve the authenticity of case-based learning (Dong, 2015).

Learning strategies were used to achieve cognitive objectives related to the core competencies of the ACGME-I. It was difficult to set affective objectives as remote learning was mostly designed to meet cognitive objectives. However, the choice of the facilitated case discussions and the videos can promote changes in behaviours, principles and emotions of learners and grant access to discussion.

Table 3. Summary of the advantages and disadvantages of the e-learning strategies (constructed from Thomas, 2016)

	Advantages	Limitations
<u>Lectures</u>	Cost-effective Can accommodate a large number of learners Can be followed by learners in multiple locations Can be recorded	Teacher-centred Passive learning Quality depends on teacher and media used
<u>Case-based discussions and journal clubs</u>	Active learning Adequate for higher-order cognitive learning Constructivist	Need involvement of all faculty Require faculty development in online learning and defined objectives

	Exposure of learners to different perspectives Safe environment for trainees	Need motivation from learners
<u>Peer-teaching</u>	Motivates learners to learn content and retrieve material Develop teaching skills	Need additional development in teaching skills Need feedback on teaching skills
<u>Videos</u>	Can approximate real-life scenarios Facilitates transfer of knowledge Exposure to rare scenarios Team skills and communications	Need faculty facilitators

D.3. Stage III: Evaluation

D.3.1. Methods

- **Further data collection: Survey**

The source of data collection was a learners' survey at the end of the study. Surveys help in obtaining people's concerning their feelings, beliefs, impressions and facts about educational issues or problems. The principal purpose is to inquire directly from people and collect data that can be analysed later, then use it to devise action plans addressing instructional problems. Surveys are likely to be conducted through a questionnaire and can be managed individually, and delivered through the internet, over the phone or in person. Surveys can help investigate the consistency of the implemented actions and appraise results as a follow up process (Tomal, 2003).

By the end of the module, a survey was conducted with the aim to have reflection from trainees with regards to their perspective regarding several aspects of the e-learning module (Table 3). The survey involved open-ended questions to generate qualitative data. Trainees were asked to evaluate the different aspects of the module, to identify the weaknesses and strengths and make suggestions for further improvement. Data was analysed and codes generated with the aim to identify the elements learners found important to them. The same steps as in stage I were followed. Surveys were conducted on an individual basis and administered online.

Quantitative information, such as satisfaction and quality of teaching helped identify areas for improvement. Means and ranges were calculated manually due to the small number of respondents. Qualitative information, such as answers to open-ended questions about the module's strengths, weaknesses, recommendations for revision, contributed in getting feedback in unforeseen domains and suggestions for adjustment.

During this period, two trainees left the programme and travelled to Europe to pursue their training. We were able to request feedback from the six remaining participants.

<u>Table3. Stage III. Data collection-Survey</u>
1. Please rate your satisfaction with the online module (scale of 1-10: very dissatisfied to very satisfied).
2. How would you rate the quality of e-teaching? (Scale of 1-10, very poor to excellent)
3. How would you describe the impact of the online activities on your knowledge and skills? (Open-ended)
4. What were the strengths and weaknesses of the activities? (open-ended)
5. How can we improve the module to achieve the required competencies? (open-ended)
6. Did the module have an impact on your engagement and motivation? (open-ended)
7. Other suggestions (open-ended)

The survey was anonymous and centred on trainees’ beliefs about the training (Appendix D).

The questionnaire consisted of satisfaction and quality of teaching rated on a Likert scale, open-ended questions and one open written question.

- **Data analysis**

Table 4. Thematic framework stage III. Survey

		Codes	Themes
Positive findings	<ul style="list-style-type: none"> • Enhanced comprehension and understanding • Broadened skills and knowledge • Journal clubs, lectures and videos • Self-preparation 	<ul style="list-style-type: none"> • Core competencies • Collaboration • Engagement • Active learning • Learning strategies • Self-regulated learning 	<ul style="list-style-type: none"> • Engagement • Self-regulated learning • Collaboration • Participation
Weaknesses	<ul style="list-style-type: none"> • Traditional boring lectures • Lack of real cases • Lack of clinical cases • Lack of input from instructors • Lack of discussion with instructors • Lack of clear objectives 	<ul style="list-style-type: none"> • Learning strategies • Interactive learning • Collaborative learning • Critical thinking • Core competencies 	<ul style="list-style-type: none"> • Training the trainers • Educational strategies • Mapping core competencies to learning objectives

D.3.2. Results of the survey

1. Satisfaction

Scores ranged from 7 to 9 (on a scale of 1 to 10) with a mean satisfaction score of 7.8. Trainees were overall satisfied with the module delivery, as it was comprehensive. Trainees endorsed immediately the module process and showed active engagement for the learning opportunity. They were highly motivated and instantly became proactive. Participants considered that the traditional format of teaching, in which a lecture is provided in a “passive way”, contributed to the dissatisfaction expressed by most of them. Most of the trainees asked for more discussion and involvement of the attendings in reflecting on their experience and opinion.

Lectures should be more “learner-centred”, facilitate higher cognitive thinking by enhancing interaction and discussion between teachers and students.

“The module was comprehensive encompassing the different aspects of bipolar disorder and mood pathology. It would have been slightly more interactive if it was done live but that was not feasible considering the current COVID crisis.” (PG III, B)

“Journal Clubs and Lectures were more practical this time around. Patient population also adequate for direct application of what was taught. Also, some real cases influenced the choices of the activities which was excellent.” (PG I, H)

“Starting with this module almost everything was covered about the Disorder, from diagnosis to novelties” (PG I, E)

2. Quality of teaching

The quality of teaching had a mean score of 7.8 with a range from 7-9. The trainees appreciated the quality of teaching and the effort that was made to ameliorate the learning experience. The encounter fosters trainees motivation for deeper and self-regulated learning. However, practical issues pertaining to clinical encounters and the input of attendings were the main gap in the teaching strategy.

“The quality of teaching was excellent, it consisted of a global understanding of bipolar disorder.” (PG, IIIB)

“I appreciate that a lot has been added to the program to improve our learning experience, however many areas continue to lack, mainly clinic exposure and involvement with psychologists.” (PG II, A)

“It was good specially the Friday’s lecture, but some journals and subject were presented but we couldn’t really see the attendings perspective on things or a specific subject (It was done in sometimes)”.(PGI,E)

3. Impact of activities on knowledge and skills

The administration of the module was given in a comprehensive manner and encompassed all issues related to mood disorder, from basic sciences to management of the disorder, which improved their knowledge and skills in medical knowledge and patient care. During these particular times of lockdown and insecurity in the country, learning activities were a trigger to foster the motivation and engagement of the trainees.

“During this time, we are enduring very challenging moments and sometimes we weren't motivated to study or to learn, so the program came in the perfect time to help us read and stay up to date”. (PG II, D)

“Very beneficial, since it helps reinforce the information in our minds by learning about it through presentations that we prepare as well as topics and lectures prepared by others” (PG I, H).

4. Strengths and weaknesses

Learning activities were delivered online, in the evening when all participants were available and at a time that did not interfere with the professional schedule of the attendings. The trainee on call was also able to attend from the hospital. The main strengths were the comprehensive approach of the mood disorders which helped strengthening old knowledge, experiencing new

one through video cases, case discussions and journal clubs. Courses were well designed with clear objectives and interactive.

“Strengths included a global and detailed understanding of the topic, from basic neurosciences to clinical manifestations which helped in solidifying my knowledge in this domain” (PGIII, B)

“In addition to the more focused journal club and lectures, there was an online case about mood dysregulation followed by a discussion which was very fruitful, as both resident and attendings contributed to the discussion”. (PG I, E)

As for the weaknesses, trainees criticised the deficiency in complex cases that might be encountered in real life and the decisions concerning management and decision taking in particular situations. Some trainees found lectures given in a very traditional way and could not relate clear objectives to certain lectures.

“Might have been our need to see things in a more practical way, some lectures were very traditional.” (PGII, F)

“Would include perhaps the lack of full participation and knowledge sharing among the attendees due to the virtual nature of the activities” (PG III, B)

“Topics should be more organized with clear objectives” (PG II, A)

5. Suggestions for improving module to achieve the required competencies

Trainees suggested more complex cases drawn from real life, with more clinical experience, more videos and simulation cases, more case discussion with attendings contributing from their own experience. Some learners preferred to get back to in-persons meetings to allow for better interaction.

“Suggestions for improvement later on would include for example, making the conferences live (after the pandemic has ended) which would enhance the interaction of all attendees during the activities.” (PG III, B)

“More case discussions. Try to encourage attendings to contribute from their own experiences. Recount cases they have seen etc....” (PG I, H)

6. Other suggestions

Other suggestions included time allocation to outpatient clinics as well as encouraging trainees abroad to take part in the discussions

“Allow more time in clinics vs hospital for older residents since it provides a chance to follow cases from beginning to end (first time presenters) ... “. (PG III, B)

“Encourage abroad residents to participate in case discussions so that our exposure is not limited to Lebanese population only.” (PG II, A)

7. Impact on engagement

The implementation of the module enhanced the engagement of the participants and triggered their motivation that was profoundly impacted by the economic situation in addition to the pandemic restrictions. Learning activities helped them to keep on track and constituted a strive for improving learning in order to achieve competencies required to become an independent professional. Furthermore, meetings increased collaboration between participants and communication with attendings.

“It helped a lot, especially during the last period. I wasn’t motivated at all to read...I like to study again!” (PG I, E).

“We were losing focus because of the economic situation and the pandemic. Being committed every week to the activities kept us on the right track.

Besides, we became familiar with each other and with the attendings.

It increased communication.” (PG II, D).

In summary, the survey provided learners the opportunity to express their perspective and reflect on the module in their own words. The satisfaction with the module and quality of

teaching were highly rated. The quick response to the crisis helped reinforcing their motivation and engagement. However, the inexperience with e-learning delivery and innovative techniques that can contribute to active learning and attainment of core competencies including knowledge, skills and attitudes constituted a weakness in the overall evaluation of the e-module.

Discussion

To our knowledge, this is the first descriptive study to examine competency-based education psychiatry training issues in a psychiatric hospital in a situation of crisis in Lebanon. The action research process allowed to depict gaps in education and training that existed prior to the pandemic and economic crisis and that were exacerbated and highlighted during this period, and to pilot an intervention to address them. Our aim was to develop strategies in case of crisis to be able to adapt to unforeseen situations in order to keep trainees engaged and reach their learning objectives in a competency-based medical education framework. Since the surge of the pandemic, concomitantly with the severe economic crisis and the severe restrictions that ensued, an urgent need was perceived to take action to preserve psychiatry training and education. To quickly cope with the situation, and after data analysis, the implementation of exclusive synchronous online educational activities was designed, responsive to the learners' needs, preferences and with the immediate resources available. The online administration was challenging for both trainees and practitioners as they were not used to this type of teaching. The main challenge was the rapid adjustment to a virtual interaction which could hamper engagement and motivation of learners.

Satisfaction with e-learning

Overall, trainees enjoyed the online experience, especially that they were able to join from the place they were or even the hospital if they were on call. In alignment with other studies, virtual learning can be as effective as face-to-face learning and can be a convenient teaching method for learners and teachers (Pei *et al*, 2019). Didactic lectures are an essential component of postgraduate training. Their efficient delivery is challenging especially when residents are located in different places. E-conferences proved to be an effective method of delivering didactics in postgraduate programme. Among their advantages, are the ease of use, cost-efficiency, and wide availability of equipment (Markova *et al*, 2002). Interactions between learners and attendings was appreciated by the learners, supporting the community of inquiry model which suggests that active learning environment is dependent on the interaction between students and teachers sharing ideas, information and opinions (Garrison *et al*, 2000).

In addition, trainees, by exposing real-life cases and presenting journal clubs, are placed in a position of near-peer teachers which can generate a feeling of competence, as sense of autonomy and esteem before others, which, in turn can motivate studying (Ten Cate, 2007).

Enhancing student engagement

Learners' engagement refers to the synergy between time, effort and resources in which learners and institutions invest (Trowler *et al*, 2010). The aim is to strengthen learners' experience and improve their learning outcomes, development and performance. In our study, engagement of trainees was encouraged by a collaborative effort and involvement in the development of the content of the module, which may enhance the opportunities for more autonomy and

exploration of new areas of learning. Their participation in course development contributes to the development of personal and professional skills, such as team work, leadership and critical thinking (Anderson, 2006). Trainees' engagement also helps in having greater insight about how they think, learn and take decisions for further improvement of teaching methods and material.

E-learning and active learning

The main concern of the trainees with online learning was the loss of interplay and the dearth of real-life examples, discussions and practical guidelines for management from attendings' point of view and experience. Some lectures were qualified as traditional and boring, emphasising the need for application of active learning principles. The same lecture, intended for a face-to-face session, cannot be delivered the same way online. Converting to virtual teaching requires adjustment for both learners and teachers (Elabd, 2021). In both cases, lectures and presentations encourage adult learning principles to promote learning outcomes (Chametzky, 2014). In our study, teachers presented mis knowledge and inexperience in adult-learning, particularly in relation with online teaching, which has affected negatively the quality of the presentations provided. The lectures were strictly didactic and trainees became passive receivers of information. The importance of active learning and technology have been emphasised in medical education to improve students' engagement and critical thinking skills (McCoy et al, 2017). Active learning represents a switch from traditional instruction and enables learners to take responsibility for their learning by engaging in discussions and activities (Wolff *et al*, 2015). This method fosters higher-order thinking, problem solving, communication and often implies group work. Active learning can be effective for expanding learning, engagement, peer collaboration and evidence-based medicine (Wolff *et al*, 2015).

Encouraging active learning by improving delivery of content, knowledge retention and self-directed learning are emphasized (Bucklin, 2021). Furthermore, trainees, as adults, learn when they are learning information relevant to them, and they are held responsible for the time and the manner of learning (Knowles, 1977). Trainees have former experience and insight, and they are repeatedly reorganising their previous knowledge when they gain something new. Recognizing trainees' prior knowledge and background and embodying their learning needs into teaching may result in a better outcome. Learner-centred education finds its origin in constructivism and context-based theories and draws attention to learning communities, incorporation, distinct pedagogies and learning outcomes (McCoy *et al*, 2017).

The evaluation survey showed that trainees had higher expectations on teachers' input and feedback. Feedback should be provided by a skilled teacher to stimulate self-regulated learning.

Self-regulated learning is a process that targets the thoughts, emotions and actions of an individual learner (Sandars, 2011). Fostering self-regulation gives trainees the ability to develop and control their internal motivation and use of strategies (Bandura, 1989), which reinforces learners' behaviours. One essential feature of academic performance is motivation which can predict learning, academic success, persistence or continuation in a study and well-being. Motivation is affected by self-efficacy belief that relates to the person's judgement of his own capability of performing the task, and the belief about the importance of the task (Sandars and Cleary, 2011).

Educators are actively involved in the process of self-regulation process. They should develop educational activities that allow learners to gain consciousness, mindfulness and sensitivity towards an achievement, to expand motivational and adaptive acknowledgements and to acquire skills to integrate a variety of strategies to reach favourable outcomes (Sandars and

Cleary, 2011). Their involvement in discussing complex articles, and cases, decision making strategies, giving feedback to trainees enhances engagement in self-regulation processes in a strategic and adaptive way (Butler, 1995). Feedback is an key component of self-regulation because it concentrates on necessary prerequisites of a performance and thinks about the behaviours or processes needed to rectify errors. Receiving feedback is important to build a personal view of strengths and weaknesses. Thus, trainees should be actively prompted to give feedback (Teunissen, 2009).

Another barrier encountered by our teachers when engaging with the process of initiation and application of online learning was the need for technical skills. Physicians are already pressured to have sufficient time managing teaching, research and maintain a work-life balance (Ayoub, 2020). In our context, inadequate time may be a drawback. Furthermore, the dearth of infrastructure and technology may be commonly seen as a barrier in medical education in low-medium-income developing countries. The lack of confidence among educators in involving themselves with new technologies is another restraint to the establishment and fulfillment of online learning (O'Doherty, 2018).

E-learning and competences

Knowledge, skills and attitudes are the three learning domains that trainees should develop for learning to happen (Bloom, 1956). Knowledge can be defined as the cognitive capacity of the student to process information. Physical abilities to accomplish duties and activities are defined as skills. Attitude is the a settled way of thinking or feeling. Theoretical knowledge may be acquired through online or virtual learning. However, learners need actual hands-on experience

and feedback from a professional supervisor to master different skills and attitudes Sugarman, 1987).

Teaching an integrated biopsychosocial approach is a priority in psychiatry. In our study, trainees expressed their desire for more learning the bio-psycho-social formulations and treatment plans in a case -based context. During the module, we were able to cover knowledge domain within several core competencies. However, the design of the module was not adapted for the teaching and the development of skills and attitudes. Other teaching strategies should be incorporated to assist trainees meeting all domains of core competencies required by the ACGME-I.

Suggestions for future work

Clinical training is a fundamental aspect of education and training; however, it has been challenged by the benefits of formal teaching. This was particularly evidenced during the pandemic and the deep economic crisis. However, knowledge is seldom the sole prerequisite to trainees achievement in competency-based medical education curriculum. Hence, it is essential to plan a curriculum which sets skills objectives in order to fill the gap engendered by a contextual period of crisis. During the interview, none of the interviewees suggested a simulation-based education. They assumed they were more in need for formal educational activities, integrating basic sciences into clinical cases and management. Upon reflection on the module, they were more aware of the advantage of such a technique in addition to role play, especially if the pandemic persists and the economic situation worsens, which will hinder their exposure to real-life cases, bedside teaching as well as outpatient experience. Attitudes and skills objectives need to be addressed, as revealed by the trainees who asked for authentic

exposure with discussions. This can be achieved by incorporating other learning strategies such as simulations, role playing, problem-based learning, flipped classrooms and telepsychiatry. This will be the second cycle of our research.

The tumultuous upheaval to virtual platforms highlighted the need for faculty development that was not pinpointed before (Ahmed *et al.*, 2020). Faculty have revealed a necessity to accommodate their current expertise and understanding of teaching designs and approaches and transmit them to the virtual platform. The capacity to introduce innovation and innovative techniques into remote learning using the available technology was a deficient area in our module. Moreover, a focus on a student-centered learning should be always maintained, with a careful choice of material that can foster active learning. Several instructional strategies and methods may be suggested to fit this purpose.

Fostering the engagement of trainees is a challenge in the e-learning process. A collaboration approach to teaching and learning is essential. An appropriate framework to explain the influence of a collaborative approach in competency-based medical education can be provided by the cognitive apprenticeship model. Instructors should support the active learner at a cognitive, affective and metacognitive levels and encourage trainees' autonomy. Educators may have to modify their teaching techniques to align with current medical education and technology. Establishing a framework would help educators reflect on their teaching practice, build up and carry out effective teaching strategies, and recognise why other strategies seem to be unsuccessful in provoking learning. Teaching and learning could be perceived from different perspectives. This could be a difficult task since learners' needs may differ from trainee to another, depending on the level of the training. Junior postgraduates may require

didactic guidance, while more advanced trainees call for making their thinking process explicit. They require to reflect, particularly upon the way new knowledge can be implemented (Ten Cate *et al*, 2004).

Acknowledging one's knowledge gaps, known as metacognitive skill, is difficult to gain and the motivation to amend them hard to generate. Instead of a didactic lecture, trainees could be presented with unknown problem for which no information exists, and find their own way to learn to solve them. Educators should be aware of the different levels of learning process and fluctuating needs for supervision, which can foster their ability to manage complexities (Ten Cate *et al*, 2011).

Innovative techniques that can be implemented in our context

- Simulation and role play

The incorporation of simulation cases with simulated patients, and role playing may be necessary for the practice of the attainment of the other learning domains. The principle is to mimic real clinical scenarios. In medicine, most of the learning happens through experience, gaining information from examining and treating patients and performing various medical procedures. According to David Kolb, learning from experience, or “experiential learning”, takes place in a cycle (Kolb, 1984). When trainees undergo this cycle, they will be performing and handling patients, then get feedback on their accomplishment. This reflection will serve to identify their learning needs, fulfill them and renew their knowledge, then apply what they learned and persevere through the cycle to progress and reshape their knowledge and skills.

Simulation confers the possibility to practice skills in a “safe learning environment”. Debriefing with a structured reflection on the experience is essential (Salas, 2008).

Role-playing, during which one trainee plays one role and another one another role, affords the ground for learners to explore a specific function. Role-play assists in developing communication skills and discussing other approaches, until the accomplishment of an adequate performance. It is efficient, inexpensive and can be transferred to any setting, including online (Nestel *et al*, 2007).

- Problem-based learning

The principle of problem-based learning is solving a problem without prior lecture. The aim of problem-based learning is to ameliorate the quality of educational outcomes through collaborative, integrative, self-directed and comprehensive learning (Challa, 2021).

Problem-based learning promotes cognitive activities such as elaboration through case discussion, note taking, or answering questions about the case, where new information is added onto existing knowledge. Problem-based learning also favors collaboration with peers and the ability to elucidate and debate distinct problem-solving approaches. Self-directed learning involves setting goals, and monitoring learning and encompasses cognitive and motivational self-regulation. Educators act as facilitators of small groups of trainees.

Problem-based learning, simulation and role-play can be incorporated as teaching strategies in order to give trainees complex material with the possibility of discussing with patients, family and medical team. It allows trainees to practice in a collaborative way with patient, family and the team and help them develop new skills in collaboration and communication (Thomas and Abras, 2016).

- Flipped classroom

Flipped classroom involves blended learning techniques with online and offline instructional content. Pre-recorded lectures are assigned to learners switching toward self-directed learning. Medical case is discussed in small groups encouraging engagement, collaboration and long-term retention of information (Hew and Lo, 2018). Learners can identify their strengths and weaknesses and can receive constructive feedback from peers and teachers to make improvements in their learning process (Challa *et al.*, 2021)

Strengths and Limitations

Most of the trainees were satisfied with the implementation of educational activities. Responding to the trainees' needs by shifting rapidly to online education helped learners keeping engaged and fostered a motivation that started to fade in the unprecedented circumstances the country was going through. However, the study had some limitations. The study was done in one psychiatric hospital, the number of trainees was small, with further attrition as two trainees left in the middle of the study. In addition, our sample involved trainees of different levels, who may have different learning needs. Thus, besides necessary teaching skills, clinical educators should understand that different methods work better in different circumstances. Teaching being done remotely; it is important to identify educational strategies used for distance learning.

For logistical reasons, satisfaction was the main outcome measure, corresponding to level 1 (reaction) on Kikpatrick evaluation model. Future work could include assessment and direct

performance outcomes. These measures will allow to exactly find out how components of social cognitive self-regulation might undoubtedly determine learners' success with online training.

The questionnaire used has reliability and validity limitations. Social desirability bias and response could notably be serious threats to the construct validity of any survey (Thorndike, 2005). The embodiment of more direct, behavioural measures in the study would support analysing how trainees' motivational perceptions and perspectives affect their current academic performance during online learning.

Conclusions

The present study describes the strengths and the difficulties encountered during a period of crisis in a psychiatry residency setting in relation to teaching and learning. We tried to identify weaknesses that were put forth during the pandemic and the unexpected political climate. We sorted out some strategies to be able to achieve a competency-oriented curriculum, as well suggestions for teachers for change. These findings confirm the necessity for a collaborative, learner-centred, competency-oriented model of teaching and learning, in order to help trainees in being engaged, motivated for a lifelong learning process. Knowledge of learning objectives and core competencies are important to integrate appropriate educational strategies in an online approach. An adequate adjustment to contextual situation modulates this integration. Both trainees and teachers must be involved in the process to foster trainees' engagement and motivation.

The impact on learning of these changes is yet to be established. The next piece of research will explore this further. We plan to:

- Incorporate interactive learning methods including PBL and videos, simulations, role-play to practice skill and attitudes in relation with competency-based requirements, to make the sessions more interactive, initiate discussions among residents and enhance collaborative learning
- Train the trainers to improve their teaching skills, encourage them to use more real-life case scenarios during their online session to make lectures more relevant to the trainees and enhance their problem-solving and critical thinking skills. We will also start using polls to bring about more engagement through active responses to different quizzes during the teaching sessions. Furthermore, we will orient case discussions prepared by trainees from real-life cases encountered in the hospital to flipped classrooms where graduates prepare and deliver the teaching session while the trainer supervises and manages the discussion.
- Train the teachers to prepare lectures in a way which is better suited to online teaching and oriented toward self-regulated learning.

Following the pandemic, many healthcare systems increased implementation of telehealth services, which will likely continue to augment and increase future telehealth use. Virtual patients, virtual reality or simulation experiences have been carried out across different specialties (Borgersen, 2018). Similar technology may be adopted in non-procedural specialties like psychiatry. Telepsychiatry and partnerships with videogaming companies allows the design of virtual clinical experiences that would request knowledge, skills and attitudes to be aligned with accredited competency domains. The advancement of virtual platforms may remodel the way clinical competence is reached, authorising graduate medical education to thoroughly adopt a competency-based educational model that is time-independent and standardised. This model allows the graduation of competent physicians. At the same time,

it can assign additional training to underperforming physicians. Graduate medical education would be ready to cope with future disruptions and forceful changes, like the COVID pandemic or unforeseen events, and be more flexible and fully-responsive to the needs of individual trainees (Der-Martirosian, 2019).

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APPENDICES

Appendix A. Research in different databases

Pubmed	
Keywords	Number of results
"Distance learning" AND "residency program"	7
("distance learning" OR "remote learning") AND "residency program"	8
("distance learning" OR "remote learning" OR "virtual education") AND "residency program"	11
("computer assisted medical education" OR "distance learning" OR "remote learning" OR "virtual education") AND "residency program"	11
("e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND "residency program"	30
("virtual education" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND "residency program"	30
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND "residency program"	32
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program")	323

("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate")	366
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate" OR "psychiatry training")	366
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND covid-19	70
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2)	70
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster)	73
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster)	74
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis OR pandemic)	76

("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis OR pandemic) AND "middle income countries"	1
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis OR pandemic) AND ("middle income countries" OR "low-income countries")	1
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis OR pandemic) AND Psychiatry	5
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program") AND psychiatry	15
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program") AND engagement	41

CINHAL	
Keywords	Number of results

"Distance learning" AND "residency program"	10
("distance learning" OR "remote learning") AND "residency program"	10
("distance learning" OR "virtual education") AND "residency program"	14
("computer assisted medical education" OR "distance learning" OR "virtual education") AND "residency program"	14
("e-learning" OR "distance learning" OR "virtual education") AND "residency program"	17
("virtual education" OR "e-learning" OR "distance learning" OR "virtual education") AND "residency program"	17
("blended learning" OR "e-learning" OR "distance learning" OR "virtual education") AND "residency program"	17
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program")	206
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate")	234
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate" OR "psychiatry training")	234
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND covid-19	15

("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2)	17
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR SARS-CoV-2)	18
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis OR SARS-CoV-2)	5
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis OR pandemic)	21
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis OR pandemic) AND "middle income countries"	1582
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis OR pandemic) AND ("middle income countries" OR "low-income countries")	No results
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis OR pandemic) AND Psychiatry	No results

("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis OR pandemic) AND engagement	1
("e-learning" OR "distance learning" OR "virtual education") AND (Trainees OR "residency program") AND psychiatry	4

ERIC	
Keywords	Number of results
"Distance learning" AND "residency program"	2
("distance learning" OR "remote learning") AND "residency program"	2
("distance learning" OR "virtual education") AND "residency program"	2
("computer assisted medical education" OR "distance learning") AND "residency program"	2
("e-learning" OR "distance learning") AND "residency program"	7
("virtual education" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND "residency program"	
("blended learning" OR "e-learning" OR "distance learning") AND "residency program"	8
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program")	487

("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate")	603
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate" OR "psychiatry training")	603
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate") AND covid-19	6
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2)	6
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster)	7
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis)	10
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis OR pandemic)	10
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis) AND "middle income countries"	0

("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis) AND "low-income countries"	0
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR disaster OR crisis) AND Psychiatry	0
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program") AND psychiatry	7
("blended learning" OR "e-learning" OR "distance learning") AND (Trainees OR "residency program") AND engagement	25

Google scholar	
Keywords	Number of results
"Distance learning" AND "residency program"	1790
("distance learning" OR "remote learning") AND "residency program"	1970
("distance learning" OR "remote learning" OR "virtual education") AND "residency program"	2120
("computer assisted medical education" OR "distance learning" OR "remote learning" OR "virtual education") AND "residency program"	2120

("e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND "residency program"	4560
("virtual education" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND "residency program"	4560
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND "residency program"	4930
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program")	16600
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate")	16800
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate" OR "psychiatry training")	16800
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND covid-19	7170
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2)	7210

<p>("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster)</p>	<p>13000</p>
<p>("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis)</p>	<p>17100</p>
<p>("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis OR pandemic)</p>	<p>16800</p>
<p>("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis OR pandemic) AND "middle income countries"</p>	<p>1250</p>
<p>("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis OR pandemic) AND ("middle income countries" OR "low-income countries")</p>	<p>1250</p>

("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program" OR "post graduate") AND (covid-19 OR SARS-CoV-2 OR disaster OR crisis OR pandemic) AND Psychiatry	4500
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program") AND psychiatry	7840
("blended learning" OR "e-learning" OR "distance learning" OR "remote learning" OR "virtual education") AND (Trainees OR "residency program") AND engagement	16500

Appendix B. Characteristics of some of the studies included

Journal	Title	year	Author	Type	education	outcomes
African Journal of Psychiatry	Videoconference-based education for psychiatry registrars at the University of KwaZulu-Natal, South Africa	2012	Chipps, J.	descriptive	Videoconferencing	Satisfaction Appropriateness of teaching tool
Psychiatric services	Psychiatric training during a global pandemic: how Covid-19 has affected clinical care, teaching, and training well-being	2020	Richards, M.	Open forum descriptive	Telepsychiatry Remote teaching Trainee well-being	Reflections and considerations for post-covid period
Psych Bulletin	Running a journal club in 2020: reflections and challenges	2020	Mark, I.	descriptive	e-journal club	Engagement in online teaching
Psychodynamic Psychiatry	Five months later: the psychodynamic psychiatrist and psychiatric care	2020	Best, K.	descriptive	Distance treatment Psychiatry training	Satisfaction Impact on patients and psychiatrists

	in the Era of COVID-19					
European Child and Adolescent Psychiatry	European effects of Covid-19 on training in CAP: the balance after a year	2021	Deschamps, P.	descriptive	Remote learning	Changes in health care services Direct effects on training and education
Journal of psychiatry reform	Building a sustainable e-learning medical education ecosystem for the post-covid-19 world	2020	Hategan et al.	descriptive	Changes in child and adolescent training post Covid	Develop a shared e-curriculum
Academic Psychiatry	Competence in Psychotherapy: The role of E-learning	2017	Hickey, C.	descriptive	e-learning	Suggest developing online modules to residents
Academic Psychiatry	An interdisciplinary flipped classroom model on postpartum depression using telemedicine and online teaching	2021	Monasch et al.	Qualitative study	Flipped classroom module	satisfaction

Appendix C. Illustrative excerpts from transcripts

<p>Excerpts from trainees (Challenges encountered during training)</p>	<ul style="list-style-type: none"> • HPC is the only hospital where we can have a great load of patients (PG II, A) • Great exposure, with the opportunity to see chronic and social cases (PG II, F) • we can see two types of cases: emergency and non-emergency (PG III, D)
	<ul style="list-style-type: none"> • The negative point is that there is no team ready in the admission. We need an Emergency Room to be able to assess and treat, and discharge patients (PG II, D) • What might be challenging is the difficulty of interviewing the patient during the acute phase (PG II, A11) •
	<ul style="list-style-type: none"> • We lack outpatient clinics availability. We should broaden our exposure by benchmarking to other hospitals (PG II, D) • We lack outpatient clinics, and “liaison patients” (PG III, G) • shortage in specific cases that we don’t see as frequently as other cases, which affects exposure in our training (PG III, B) • Since the COVID pandemic, HPC closed, which had limited our exposure to psychiatric patients (PGII, A) • during the pandemic, our training was also slightly compromised because people refrained from coming to the hospital (PG III, B) • since the COVID, the load of patients decreased. As residents, we don’t see enough patients. I consider that I have gaps (PG I, E) • due to economic situation, patients were unable to seek psychiatric help, which had effect on our exposure (PG II, A) • the economic situation increased psychiatric needs whereas admissions were reduced (PG II, F)
	<ul style="list-style-type: none"> • Before the pandemic, we didn’t have enough time to focus on theories, having lectures and focusing on certain modules, basic sciences for example, which can help us have a more rounded clinical training (PG III, B) • There is no teaching at the hospital. We don’t have review of medical records, nor staff meetings to discuss and follow-up on patient’s records (PG II, D) • work load and the number of patients each trainee has to take care of makes it about impossible to meticulously review and perfect the treatment (PG III, C).

	<ul style="list-style-type: none"> • we have to struggle with the different approaches of attendings whether in the Interview style or pharmacological treatment which can be very subjective and different and may lead to confusion if there is no specific time in which they can be explained to the trainee (PG III, C) • The economic situation makes it harder because the number of trainees is decreasing and the number of patients is increasing, which increases the stress on the trainees and may impact their efficiency (PG III, C) • during COVID, admissions rates were drastically reduced as well as the quality of care (PG II, F) • Training stopped with the pandemic. We found ourselves doing nothing, just on-calls for medical issues (PG III, G). • Covid had a negative impact. Patient load diminished drastically. There was a reduction in case discussions, which are very important in psychiatry where we need to sit and discuss many issues (PG I, H) • after blast, there was a surge of persons having problems adjusting to life and dealing with the trauma after blast. This is a double edge-sword because of lack of people coming as well as a specific surge in certain cases dealing with adjustment and trauma (PG III, B)
	<ul style="list-style-type: none"> • For education, you can be an independent learner. But not enough. Having modules is a very good opportunity. The system must fix the minimum required (PG III, G). • There is a lack of academic supervision. Trainees are left to themselves to study (PG II, D) • The programme is not clear. We need to know about our learning objectives at the end of each year (PG I, E)
	<ul style="list-style-type: none"> • we need more autonomy in our management of the patients. We need to take decisions and then discuss them with the attendings (PG I, E)
	<ul style="list-style-type: none"> • One advantage was the time to study (PG, III, G). we were able to review all the programme. Congresses were also online. However, it was a routine and slow motion (PG III, G) • one advantage of Covid is the reduction of pressure. We could study more (PG I, G).
	<ul style="list-style-type: none"> • Salaries reduced a lot which affected the motivation of residents (PG II, A21)

	<ul style="list-style-type: none"> • A certain demotivation surged because of two things: COVID and lockdown. The restrictions wouldn't allow us to study. In addition, the economic and political situation is very demotivating. It creates frustration and insecurity (PG II, D).
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<p>Excerpts from trainees (suggestions)</p>	<ul style="list-style-type: none"> • Students should be exposed to inpatients as well as outpatients to see what measures should be taken [...]in both settings (PG II, A) • There should be more exposure to outpatient clinics (PG II, A) • Attend outpatient clinics (PG I, H) • Let trainees take care of chronic patients (PG II, D) • Management by the residents, and then the attending will come and discuss (PG I, E) • Training in geriatric psychiatry, child psychiatry (PG II, F) • Lack of exposure to eating disorders (PG II, F)
	<ul style="list-style-type: none"> • One way to keep residents motivated is to create an outpatient programmed to allow trainees to examine patients on their own, then get back to the attending who will finalise [...] for free (PG II, A) • Create OPD where residents can take in charge patients as well as outpatient clinics, where residents can be in the frontline (PG II, F) • We need “liaison psychiatry” where we can see psychiatric patients in medical floors (PG I, H)
	<ul style="list-style-type: none"> • Academic activities, like journal clubs, lectures prepared by attendings and trainees (PG II, A) • Let trainees prepare lectures by themselves to be more engaged (PG II, D) • We need journal clubs as well as integrated modules (PG II, D) • Journal clubs, having the point of view of attendings (PG I, E) • Didactic lectures with explanation (PG I, E) • Case discussions especially on a practical point of view which will be different from what is written in the books (standardized) (PG I, E) • To achieve learning outcomes related to the core competencies, we need more theory, more modules that have to do with basic science (PG III, B) • Focus on basic sciences in mental health (PG III, B) • Case presentations (PG III, C) • Case presentations and lectures (PG II, F) • Role playing (PG III, C)

	<ul style="list-style-type: none"> • Case discussions, lectures, journal clubs (PG I, H)
	<ul style="list-style-type: none"> • Give the trainees responsibility to teach the students to teach them leadership and guide people around them (PG II, A)
	<ul style="list-style-type: none"> • Having more research opportunities (PG II, A) • Research fostering (PG II, F)
	<ul style="list-style-type: none"> • Having a more structured educational programme with set dates for lectures and set modules (PG II, A)
	<ul style="list-style-type: none"> • Send trainees to Europe or USA to complete their training (PG II, A)
	<ul style="list-style-type: none"> • During COVID, the lack of patients can be compensated by case discussions about real life cases (PG II, A) • To achieve competencies, we need more time to discuss evidence-based practice (PG III, C)
	<ul style="list-style-type: none"> • There is a lack of therapy and psychology training. [...] this is something we might need to do later (PG II, A) • Need psychology training (PG I, H)
	<ul style="list-style-type: none"> • Time frame to allow trainees to debrief and talk about their own mental health (PG III, C)
	<ul style="list-style-type: none"> • More frequent trainee evaluation with constructive criticism, and more clear objectives as what should be achieved during the rotation (PG III, C) • Take assessments after the modules and then after a year (PG II, D)
	<ul style="list-style-type: none"> • The most challenging part in implementing modules [...]is the timing (PG III, B) • One of the most challenges is the lack of time. We need to prioritise the tasks that trainees have (PG III, C) • Online modules and journal clubs can be provided in the afternoons over WebEx (PG II, D)
	<ul style="list-style-type: none"> • Develop guidelines to follow during admissions, follow them and review protocols during staff meetings (PG II, D)
	<ul style="list-style-type: none"> • Develop telepsychiatry where residents can attend online
	<ul style="list-style-type: none"> • University diplomas in forensic medicine, psychotherapy (PG II, F)
	<ul style="list-style-type: none"> • Special needs care. Get in contact with associations and NGOs in Lebanon (PG II, F)

Appendix D. Excerpts from the survey stage III

Satisfaction	<ul style="list-style-type: none"> • Module was comprehensive and encompassed different aspects of bipolar disorder • Journal clubs and lectures were practical • Content, presentation and online teaching
Quality	<ul style="list-style-type: none"> • Excellent • Global understanding of bipolar disorder
Impact on knowledge and skills	<ul style="list-style-type: none"> • Helped in broadening knowledge as well as skills • Enhanced my understanding of bipolar disorder which helped in the diagnosis, treatment and management of bipolar disorder • Reinforce the information in our minds by preparation by ourselves and by others • Pushed me into reading
Strengths	<ul style="list-style-type: none"> • Involvement and case discussions. This pushed me to get answers after I realised what I lacked • Global, detailed, understanding of the topic from basic neuroscience to clinical manifestations • Focused journal clubs and lectures • Online case about DMDD followed by a discussion was very fruitful • Online availability, timing, schedule • Wide range of ideas • Impact on engagement
weaknesses	<ul style="list-style-type: none"> • Should be more organised • Lack of real cases • Poverty of clinical cases • We couldn't see the attendings' perspective • Some lectures were very traditional, need to be more practical • Absence of case discussions
Suggestions for improvement	<ul style="list-style-type: none"> • More organised • Set clear objectives • More clinical cases • Real-life cases • More videos • More clinical cases • Simulations, role play

	<ul style="list-style-type: none">• “Table ronde” with the point of view of different doctors
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