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Interactive Instructor for a Synergistic Student-Centered and Personalized Teaching: A Biosocial Approach

Idris Adewale Ahmed[1,2,3] and Maryam Abimbola Mikail[3]

Abstract

With or without pandemics, successful knowledge transfers and instilment of critical thinking in learners are strategic to teaching delivery. To revolutionize teaching practice and profession, the specific needs of every group of learners (such as gifted and talented, depressed, attention deficit hyperactivity disorder students, minority ethnic pupils, and low attaining) must be met. Therefore, a new paradigm that employs the right teaching styles for the right student at the right time should be adopted. A plethora of research has shown that enhanced understanding, retention, and critical thinking are better promoted in active learning strategies as compared to conventional passive learning. On the other hand, students' critical thinking is most effectively enhanced by instructional approaches that incorporate constructivist, active-learning, and student-centered philosophies, in addition to other concepts like biosocial, psychological, psychosocial, emotional, motivational, and sociocultural perspectives. The execution of such a holistic perspective would inevitably require concerted efforts from all relevant key players and stakeholders.

[1]Universiti Malaya, Kuala Lumpur, Malaysia
[2]Department of Biotechnology, Faculty of Applied Science, Lincoln University College, Petaling Jaya, Selangor, Malaysia
[3]Mimia Sdn. Bhd., Selangor, Malaysia

Corresponding Author:
Idris Adewale Ahmed, Centre for Natural Products Research and Drug Discovery (CENAR), Level 3, Research Management & Innovation Complex, Universiti Malaya, Kuala Lumpur 50603, Malaysia.
Emails: idrisahmed@um.edu.my; ahmedris1400@gmail.com; idrisahmed@lincoln.edu.my

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Introduction

The coronavirus disease (COVID-19) originated in Wuhan, China in December 2019 and is caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). It has not only spread to the entire world but has also undoubtedly become the greatest global catastrophe of the century with a profound impact on the global economy, educational and health institutions, politics, and social changes (Benitez et al., 2020; Chakraborty & Maity, 2020; Mishra et al., 2020; Shakeel et al., 2020). The devastating effect of the COVID-19 pandemic has had enormous consequences for the safety of teachers, learners, the learning environment, and laboratory facilities, especially for students and skill acquisition that require equipment and collaborative work. The current situation has necessitated the use of virtual distance education otherwise known as remote online learning to mitigate the risk of contracting the virus. This has, however, seriously challenged the usual teaching mode and the linking of theory to practice (Benitez et al., 2020).

The new norm, that is the transition to remote online learning or virtual distance education, has been quite challenging for most educational institutions because of its inherently inactive process and often occurring asynchronously. Such a drastic and inevitable transition has made certain pedagogical strategies, that normally require active student engagement, increasingly out-of-reach and complicated (Kiernan, 2020). According to the World Health Organization (WHO), the global COVID-19 cases have so far affected over 108 million individuals with more than 2.4 million confirmed deaths in 223 countries or territories, as of 17th February 2021 (WHO, 2021). With increasing cases of COVID-19 and more infectious mutated variants of SARS-CoV-2 being detected, it remains greatly uncertain the possibility of returning to normal face-to-face settings as well as the future impacts of the pandemic on teaching and learning practices post-COVID-19. Thus, there is a dire need for educators and other stakeholders to quickly accept and adapt to the new pedagogical realities forced upon us by the COVID-19 by maximizing various technological advances to evolve, revamp, rethink, and redesign the education system to facilitate effective knowledge transfer (Benitez et al., 2020; Kiernan, 2020; Masterton et al., 2021; Mishra et al., 2020). The strict adherence to public health strategies such as personal protective equipment (face masks and alcohol-based sanitizers), social distancing, proper hygiene;

self-isolation, quarantine, active monitoring, and contact tracing should also be enforced and adopted by all and sundry to effectively contain the disease spread and surveillance (WHO, 2021).

On the other hand, with the unprecedented increase in the diversity of young learners (such as gifted and talented, depressed, attention deficit hyperactivity disorder students, minority ethnic pupils, and low attaining), educators, teachers, and instructors are faced with the challenges of identifying innovative teaching strategies as well as alternative teaching tools that can be used to foster greater understanding, comprehension and enhance the learning experience (Diekelmann, 2001; Parviainen et al., 2020). Teaching strategies that engage students and stimulate further interest in the subject area are imperative, especially in today's settings where teaching has to be redesigned. Lecturing is the most common teaching strategy widely used for the delivery of the theoretical component used in adult education programs (Bligh, 1998). Though lectures are as effective as other methods for teaching information, it is, however, ineffective in stimulating higher-order thinking and cannot be relied upon to inspire or change students' attitudes favorably. The student learns through active engagement in deep processing of the subject matter for knowledge transformation to occur (Clynes, 2009). Therefore, the focus should be shifted from that of the teacher and teaching to that of the learner and learning. Thus, teachers should assume the role of a facilitator or mentor in the learning process. For students to develop confidence in their knowledge and skills as well as the ability to translate information into effective practices, they would have to develop the responsibility of exploring and questioning rather than passively accepting any model. There is also a strong need to understand the learner's stage of learning so that an appropriate teaching strategy can be employed (Warburton et al., 2016). The most favorable teaching techniques are those that prepare students to be life-long effective learners. Lifelong learning means that learners should acquire and also utilize both skills and attitudes throughout their studying and working lives. It essentially means that people should continue to learn in all aspects of life such that individuals are encouraged and supported in taking responsibility for the organization and monitoring their learning progress.

The complexity and challenging nature of the process of supporting learning in practice require that mentors should be both vigilant and astute. The knowledge of learning theories and their application is not enough until it is used in forming the theoretical foundation on which a mentor develops and organizes a wide range of technical, practical, and emotional skills to support learners in different circumstances (Warburton et al., 2016). Effective communication with both compassion and empathy for the learners' needs and

Table 1. Categories of Learners, Relevant Mentoring Skills, and the Ideal Techniques to Create a Life-Long Learning Experience.

Categories of young learners	Relevant mentoring skills	Ideal techniques to create a life-long learning experience
• Gifted and talented • Depressed • Attention deficit hyperactivity disorder • Minority ethnic pupils • Low attaining	• Knowledge about learning theories and their theoretical foundations • Effective communication • Compassion and empathy for the learners' needs and apprehensions	• Interactive instructions • Logical practice as a vehicle of evidence-based practice • Opportunistic flexibility and reflexivity in terms of content, process, and timing • Active and deep learning • Constructivist educational strategies

apprehensions is one of the most important mentoring skills. Preparing students for a professional role and the need to engage in lifelong learning require a proper understanding of how one learns and how learning can be maximized, with the flexibility to meet the needs of their future societies (Warburton et al., 2016).

Furthermore, learners respond more favorably to interactive instructions and learning materials than the conventional teaching approach because students are allowed to learn at their own pace, go back over the material for better understanding, and choose a suitable time when ready to learn (Schare et al., 1991). The students learning environments have long been described as being themed with complexity and unpredictability and, therefore, uncertainty (Barker et al., 1999; Mitchell & Cody, 2002; Mitchell & Pilkington, 2000). A complex and more responsive educational intervention that combines knowledge, performance, skills, and attitudes (Cowan et al., 2005) is, thus, required to ensure high-quality practice-based learning.

The accumulation of greater knowledge, as well as a better application of that knowledge, is enhanced through improved logical practice as a vehicle of evidence-based practice (Ceci, 2003). Effective learning (Table 1) requires opportunistic flexibility in terms of content, process, timing, and preparation for future learning reflexivity rather than pre-determined learning (Bhoyrub et al., 2010). Though a teacher can communicate competency-related knowledge and skills that the learner can replicate and repeat in predictable

environments, the learner must be enabled to independently integrate new work-based experiences into existing schematic and behavioral structures for competencies to be enacted and most vitally adapted within the unpredictable practice-based environment (Hase & Kenyon, 2007). An inherent element of such a transformational pedagogy is what is termed "student agency" (Kiernan, 2020).

A practical implication of teaching style and strategies is the teachers' need to understand how their teaching style and strategies are likely to affect the epistemological and motivational beliefs of learners in general and/or of particular groups of students. To involve learners in a community of learning where all students' needs and values are not only understood but also respected, teachers must have a better and broader understanding of teaching and learning.

Teachers play an essential role in the improvement of outcomes for students (Alton-Lee, 2003). Effective teaching enables students to achieve the intended outcomes. 'If the teacher is clear about it, the students will get it".

Contemporary education and training have become a process where learners are expected to be involved in planning what is to be learned, how, and when as well as how the learning should be assessed rather than being almost entirely instructor- and provider-controlled. Personalized instruction with its components (assessment for learning; effective teaching and learning; curriculum entitlement and choice; school organization; and beyond the classroom) enhances the advanced understanding, self-confidence, liking, usefulness, and motivation to think critically with a low level of anxiety when learners are actively engaged by the teachers (Figure 1). It also enables deep learning rather than the acquisition of a few skills. Personalized learning might necessitate activities such as the reorganization of teaching assistants, learning mentors, and administrative staff to provide more flexible support to individual learners and small groups as well as extending alternative curricular pathways and work-related provisions to increase opportunities for all learners (Sebba et al., 2007).

Furthermore, learning should be viewed both as personal engagement and social-interactive engagement. Thus, other essential physiological processes like intuitions and emotions are essential to both cognitive and social practices. This is what is referred to as the "Biosocial approach" in the literature (Hanrahan, 2003). It is simply an intersection between biological and social phenomena (Springer et al., 2012).

Therefore, this review aims to identify and suggest how the learning construct could be revolutionized around a biosocial approach as well as the role

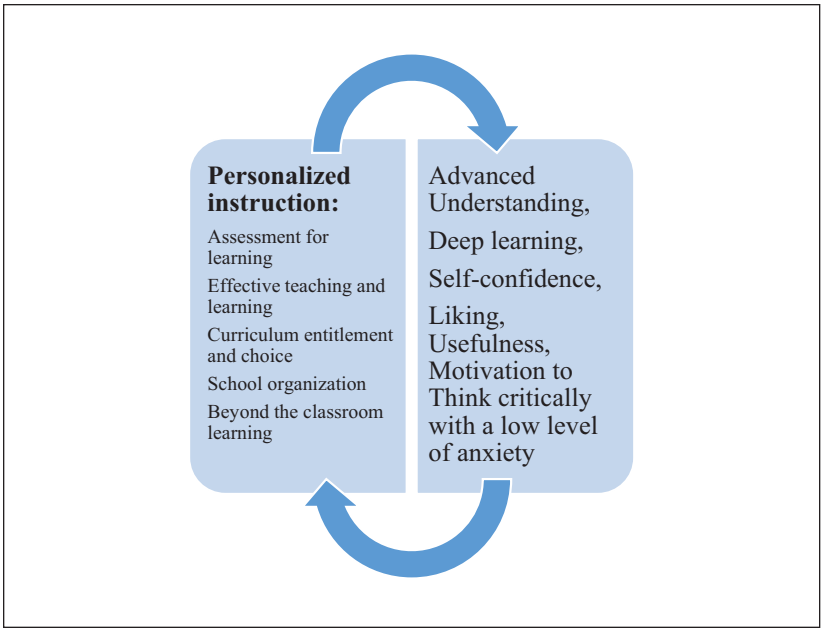

Figure 1. Benefits of personalized instruction.

and the relevance of an interactive facilitator in achieving a synergistic student-centered, personalized, and lifelong learning.

Learning Approaches

There are over 50 major theories that address the way every individual learns (Mantle, 2000). The learning process should be seen as a partnership between the teacher and learner, such that both parties mutually identify the learning opportunities and objectives. Mentors should also assist the learners to identify suitable learning opportunities that would best fit their stage of learning. Pragmatic teachers with extensive knowledge of their specialist area and an understanding of educational theory are central to effective learning (Coe et al., 2014). A few of the most common learning strategies and theories that are relevant to this discussion are elucidated below. Admittedly, this review does not cover all effective approaches but only intends to highlight a few relevant ones.

Personalized Learning

The focus of personalized learning is on individuals' need to identify their own learning needs and specific styles of learning to foster optimal learning (Davidson, 2004). With personalized learning, learners have the opportunity to learn in ways that best fit their individualized needs. The reasons for the adoption of individualized learning support and student-centered approaches by mentors and practice teachers include standards development, increased promotion of learners' engagement, commitment, and motivation (Bailey-McHale & Hart, 2013; Xie et al., 2020). Students' self-determined motivation, performance, and self-regulation, however, are products of enjoyment in any student-centered learning environment (Kulakow & Raufelder, 2020). Personalized learning requires the use of various learning styles to aid the planning and development of learning. Learning planning is the breaking down of the learning into learning domains, for instance using the domains proposed by Bloom (Bloom, 1956): (i) Cognitive—knowledge and mental reasoning, (ii) Psychomotor—physical skills, and (iii) Affective—feelings, values, and beliefs.

Similarly, using the experiential learning cycle of Kolb (1984) as a tool to analyze the learning style of students and to determine their preferred learning approach (Honey & Mumford, 1992), the possible outcomes are an activist, reflector, pragmatist, and theorist. Activists learn through active involvement in the learning experience. Reflectors learn through observation. Pragmatists learn through engaging in problem-solving, new ideas, and applying learning to practice. Theorists learn by seeking a logical understanding of the theory behind whatever they observe and consider as problems. The use of the aforementioned tools may enable educators to adapt their methods of delivery to that which the learner has an affinity for. Additionally, educators can also help individuals to develop the styles of learning in which they are weak (Honey and Mumford, 1992). The identification of students' learning styles is useful in diagnosing and providing an explanation for failed learning when the adopted methods of teaching are at odds with the student's preferred learning style (Kilgallon & Thompson, 2012). Mentors and practice teachers should incorporate individual learning needs and existing knowledge of their student(s) in detail into their lesson plan or equivalent tools when planning learning opportunities in practice. This would not only be useful in providing structure and flow to the lesson but also in identifying what materials may be required (Billings & Halstead, 2016). Lesson plans should be used in the planning of dedicated learning sessions irrespective of location because it ensures that essential aspects are not forgotten during the session. According to Gopee (2011), the use of the Herbartian rule, named after its proponent Johann Herbart, provides a

sequence of how a topic should be broken down and presented. For instance, new concepts and previous knowledge should be linked together, simple explanations should be provided for more complex areas of the topic, and specific examples should be used to illustrate general theories and how things are done and why.

According to Hargreaves (2004, 2005a, 2005b, 2005c),there are nine gateways and approaches to personalized learning: curriculum, learning to learn, workforce development, assessment for learning, school organization and design, new technologies, pupil voice, advice, and guidance as well as mentoring and coaching. Pupil voice, assessment for learning, and learning to learn contribute to deep learning because it involves the capacity to learn, control over learning, and competencies. Similarly, the curriculum and new technologies enrich the experience of learning thereby enabling deep learning embedded in the deep experience while advice, guidance, mentoring, and coaching provide the deep support demanded. Personalized learning puts the learner at the heart of the process. Munn et al. (2004) also identified, concerning curriculum reform, the need for flexibility, choice, relevance, and meeting individual needs as essentials of personalized learning. The links with parents and the community, networking with other schools, and with organizations in the local community are examples of beyond-the-school activities in personalized learning to raise learners' aspirations and tackle barriers to learning. To be effective, however, collaboration needs resources, leadership, shared direction, ownership, and responsibility (Sebba et al., 2007). Personalized learning also refers to the high expectation of every child, given high-quality teaching based on sound knowledge and understanding of each child's needs. It emphasizes the facilitative role of teachers and schools through the shaping of teaching, otherwise referred to as "tailoring" (Sebba et al., 2007). In other words, it is to ensure that every learner achieves and reaches the highest standards possible, notwithstanding their background or circumstances through tailoring education to individual needs, interests, and aptitude. Leadbeater (2004, 2005) has characterized "personalization" in terms of participation. He argues that rather than focusing exclusively on service providers attempting to improve the service, personalized learning offers a real opportunity for learners to participate fully, becoming co-producers in decisions about the supply and public value of education. Personalized learning is the process of strengthening learners' voices in the school that increases their capacity to participate in decision-making. The major constraints to implementing personalized learning like any other learning initiative, however, are funding, time, and resources. Besides, the philosophy must be articulated and shared by staff and inspired by a strong head with the clarity of educational vision (Sebba et al., 2007).

Storytelling

Utilizing unique student experiences and backgrounds to enhance didactic and other technical teaching seems to be one of the best options, especially in online and remote environments. A strategy that fulfills this approach is storytelling, otherwise known as narrative pedagogy (Davidson, 2004; Kiernan, 2020). It is a means of sharing, interpreting, and interrupting stories and combines components of conventional, phenomenological, critical, and feminist pedagogies. With such participatory learning, learners are actively engaged in the learning process. A safe group environment fosters narrative pedagogy. Students who are uncomfortable with "sharing stories" can also benefit from the storytelling approach by asking questions and seeking information from peers. Thus allowing more personalized learning opportunities than traditional lecture delivery methods (Davidson, 2004). Kiernan described and designed a "Personal Narrative Project" that was scaffolded in stages across an 11-week term to create opportunities for learners to access and build upon their existing knowledge funds by connecting coursework to the pandemic (Kiernan, 2020).

The concept of storytelling has been used as a formal pedagogical teaching tool and communication technique in interdisciplinary areas such as medicine (case studies, for instance), nursing, education, and business. Stories are simply a direct expression of a literary and cultural heritage; and through stories, different cultural norms are not only appreciated and understood but also kept alive (Pedersen, 1995). In most cases, involving a lot of technical terminologies, storytelling offers learners an opportunity to visualize conceptual situations in a realistic light (Ramsey, 2000). Stories often serve as a "trigger" to recall more specific complex terminologies and processes. With group trust and a safe environment students would share stories, experiences, and probe issues at a deeper level than traditional classroom techniques. Storytelling is an effective teaching method that fosters attributes such as empathy, caring, compassion, and the development of cultural competencies, which are difficult to embrace through traditional teaching approaches such as lecture and question & answer sessions (Davidson, 2004). Storytelling also stimulates critical thinking and a deeper understanding of situations in "real-life terms."

Self-Directed Learning

The evolution of the various approaches (such as the provision of free time within a formal timetable and structuring of the teaching strategies to include specific pre-set independent reading or preparation by the students) to the use

of self-directed learning (SDL) is consequent to the fact that not all contents delivered to students need to be formally taught (Kulakow & Raufelder, 2020; Quinn, 2000). SDL is also used as the common basis of summative or formative assessment (Endacott et al., 2004).

Facilitation, as a *sine qua non* teacher input, is a basic requirement of independent learning, according to the literature (Rogers, 1983; Rogers & Freiberg, 1969). It implies that effective and productive SDL occurs in the presence of a facilitative student/teacher relationship and is not a fully independent student activity. There are basic skills that need to be fostered and developed in the learners to enable them to retrieve, read, and analyze the suitable material to fully maximize the students' SDL potential. Such skills include independent learning that is facilitated by the teachers in some way, diagnosis of their own learning needs, the setting of objectives, and designation of key tasks toward achieving these with the support of the facilitator. More attention should be paid to one-to-one or small group learner supervision for a realistic SDL. Besides, consideration should also be given to the extent to which a personalized approach fits within the current curricula. The expectation of SDL is not simply for students to study, read, or perform learning-related tasks but rather for students to decide upon and reach learning goals independently (Timmins, 2008).

Heutagogy

Heutagogy is a learner or self-determined approach to learning which acknowledges that people learn through random responses to unpredictable needs, frequently when faced with the limits of their current knowledge or capabilities (Hase & Kenyon, 2000). "Heut" is derived from ancient Greek and denotes the self. Therefore, heutagogy is best understood through its connectedness and relationship to both complexity theory and individual capability. It implies that learning, timing, and content within the constantly changing environment should be learner-determined.

Heutagogy curriculum is a "living" curriculum that changes in line with what is learned and incorporates the learner into the learning acquisition and the end product (Hase & Kenyon, 2007). It thus influences holistic learner development, inclusive of the underpinning values of capability and self-directed problem-based pedagogic learning (Knowles, 1990).

The potential of heutagogy is to encourage students to develop the fortitude, knowledge, and skills expected of life-long learners in 21st-century settings, to make possible life-long learning and the ability to thrive in constantly changing learning environments. It also captures the ideal way in which knowledge should be created in complex changing environments such that

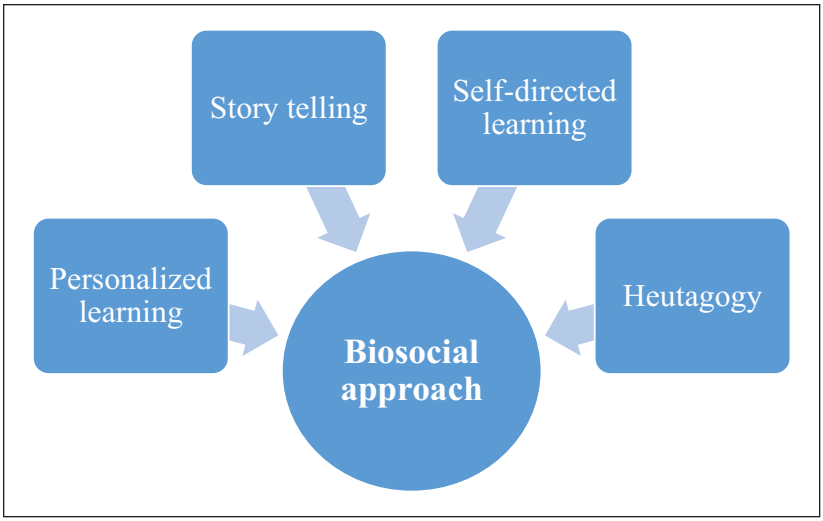

Figure 2. Integration of relevant learning styles with the biosocial approach.

the learners are placed at the center of the learning process to encourage self-management and a high degree of self-efficacy. Therefore, teachers and educators must be responsible only as guides to the development of ideas rather than force-feeding the wisdom of others (Hourigan et al., 2006). The goal of learning should be to develop and nurture life-long learners, problem solvers, critical analysts, and researchers, or at least readers of research (Darbyshire & Fleming, 2008). Life-long learning is concerned with continually developing themselves and others. Learners should be facilitated toward learning, rather than being directly taught. This reduces the risk or experience of being under threat, and subsequently allows relaxation of ego boundaries and hence being more open to learning (Figure 2). Effective learning environments should minimize the threat to the self and promote a differentiated perception of experience (Ashton & Newman, 2006). This consideration of the learning environment would not only not develop learners' skills and knowledge but majorly develop their capabilities.

Biosocial Approach

To take teaching and learning from the realm of acculturation to that of transmission and construction, the methodologies should be selected based on the learners' needs rather than based on the teachers' skill limitations. Therefore, it is important that teachers are acquainted and comfortable with serving in

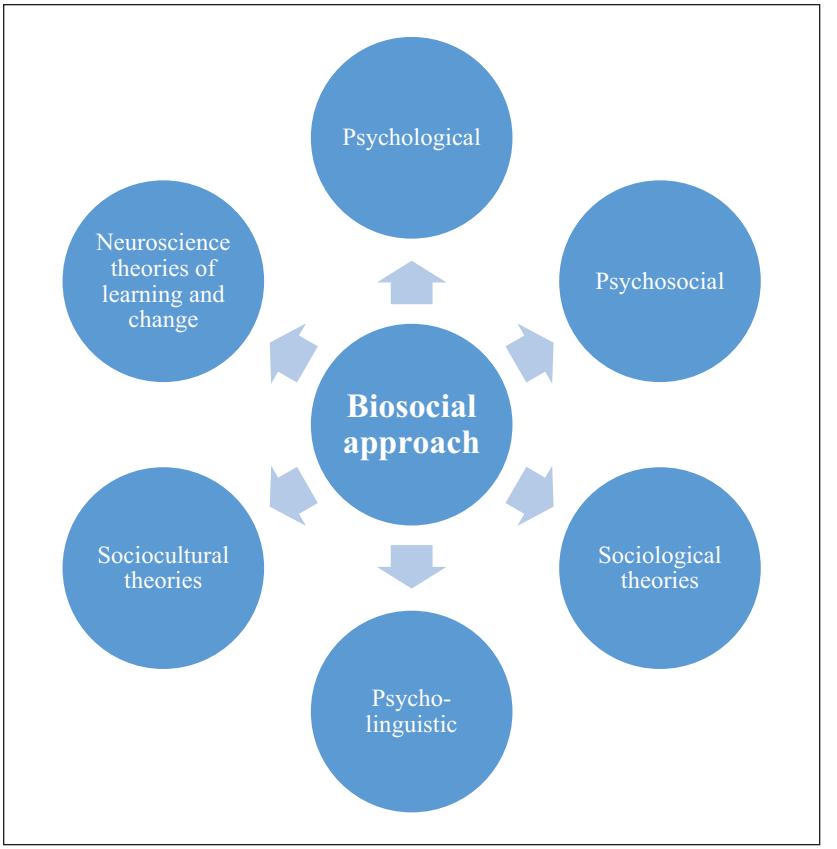

Figure 3. Components of the proposed biosocial approach.

different learning contexts and to be able to adjust to and also be professionally prepared to be involved in any learning process. Learning is both a social practice and a minds-on activity that also takes into account the "psychology" of humans as living organisms. In other words, engagement in learning is a process involving both personal and social factors, with physiological processes such as intuitions and emotions being essential to both cognitive and social practices. The biosocial system theory of learning and development is the integration of theories from a range of perspectives (Figure 3), including psychological, psychosocial, and neuroscience theories of learning and change, as well as sociocultural theories including psycholinguistic and sociological theories (Hanrahan, 2003; Xie et al., 2020).

Psychological theories in education emphasize the importance of personal factors in learning. Such factors include but are not limited to cognitive science, critical literacy, or a humanistic perspective. Self-regulation of learning also implies concepts such as autonomy, the locus of control, motivation, self-efficacy, thoughtfulness, metacognition, and attribution (Hanrahan, 2003). Emotions play an important role in everyday thinking processes and scientific intuition. In contrast to the psychological perspectives, research in sociocultural theories has largely focused on social interactions in classrooms, the cultural conflict between normative science and indigenous cultures, minority groups, and gender equity (Hanrahan, 2003; Lemke, 2001). Thus, the focus has moved from processes operating within every individual to processes operating within social groups and society more generally. Psychosocial theories see learning either as an essentially individual cognitive process that is influenced by social factors or as essentially a sociocultural process that allows individual factors (Xie et al., 2020). Sociolinguistic theories, as an illuminating group of sociocultural theories, demonstrate the use of language within discourse systems. The goal is to be able to perform many functions simultaneously, including ideational, textual, interpersonal, and orientational functions (Hanrahan, 2003). Neurological theories of learning believe that emotions are dependent on physiology while socio-cultural expression, otherwise known as feelings, is crucial for effective cognitive and social functioning (Damasio, 1994).

The combination and application of psychological and sociolinguistic theories of learning would help to engage learners more fully in the learning process. It enables teachers to respond positively to learners' needs, such as treating them with respect and demystifying the mysterious aspects of the classroom discourse. From a biosocial system perspective, the personal and the social are comparable to two sides of a coin with many interactive layers. The emotions are visualized as a multi-colored filter between the social and the cognitive domains of functioning, or between the physical and sociocognitive domains. Learners can experience emotions such as anxiety, frustration, fear of failure, and shame when they are confronted with the demands of an unfamiliar discourse system (Hanrahan, 2003). Substantiating this fact are the three key findings from the research of Donovan et al. (1999):

1. Students come to the classroom with preconceptions about how the world works. If their initial understandings are not engaged, they may fail to grasp the new concepts and information that are taught, or they may learn them for purposes of a test but [then] revert to their preconceptions outside the classroom (Engaging with prior knowledge and preconceptions).

2. To develop competence in an area of inquiry, students must: (a) have a deep understanding of factual knowledge, (b) understand facts and ideas in the context of a conceptual framework, and (c) organize knowledge in ways that facilitate retrieval and application (Developing a deep foundation of knowledge, using conceptual frameworks).
3. A "metacognitive" approach to instruction can help students learn to take control of their learning by defining their own learning goals and monitoring their progress in achieving them (Taking control of one's learning through metacognitive and self-regulatory processes).

Having reviewed relevant literature on the existing learning approaches, the following section summarizes our perceptions of the putative correct and essential attitudes to teaching and learning as well as the role of critical thinking.

Learners' Attitudes and Creativity

Attitudes are learned predispositions to respond either positively or negatively to certain concepts, objects, persons, or situations. Students' attitudes generally have a profound bearing on their achievement (Awofala et al., 2013; Kulakow & Raufelder, 2020); hence, the development of positive attitudes toward school subjects had long been a major goal of educators. In particular, the concern for learners' attitudes toward learning in the school curriculum has risen above the possibility of enhancing cognitive performance (Awofala, 2014; Awofala & Nneji, 2012; Kulakow & Raufelder, 2020). The shift from a teacher-centered approach to a learner-centered approach is a semantic shift involving an actual putting of the learner's needs at the center of activities. Adult learning is characterized by purposeful learning, voluntary and active participation, clear goals and objectives, feedback, and opportunities for reflection (McKimm & Jollie, 2007). Teaching and learning involve a complex synthesis as well as the integration of knowledge, skills, and attitudes in the minds of the learners. For any teaching system to be successful, learners must have an interest in the content, must relate the content to their own experience, must see how the content has potential for future work or assessments, while the teacher must be enthusiastic, must organize the session well, have a feeling for the subject, conceptualize the topic, have empathy with the learners and also understand how people learn.

Learning is the process of acquiring new knowledge, skills, insights, and attitudes. The useful and pragmatic definition of learning is increasing knowledge to increase the capacity for effective action. Learning can either be single-loop or double-loop. "Single-loop" means the occurrence of learning

with little impact on outlook or behavior, while "double-loop" learning occurs when the activity results in modification of the learner's attitudes or behavior. With an unprecedented increased focus on learning and problem-solving skills, as well as other generic or employability skills, double-loop learning is important in today's context (McKimm & Jollie, 2007). In terms of learning outcomes, improvement of learner's satisfaction, and teacher's sense of professionalism, an effective teaching facilitates personalized learning and a blend of delivery forms (Smith & Dalton, 2005). An effective strategy for developing skills for higher learning in younger learners is to provide supportive guidance with increasing responsibility for their learnings. Furthermore, critical and reflective thinking should be built into assessment tasks while attention should be paid to self-esteem and self-confidence development where necessary (Choy & Delahaye, 2005).

Personalized learning entails collaborative approaches to learning combined with the rigorous use of assessment information to set targets for achievement, based on an understanding of a learner's current skills and capacity. The conception of learning is not limited to a process focused on individual learning in traditional classrooms, it is more useful to understand learning as a social activity, where teams of learners work and learn in partnership with one another and their trainers (Chappell & Hawke, 2005). Learners should be allowed to learn at high levels, construct their knowledge, develop their talents in effective ways, and see the instructions as enabling diverse learners. Effective teaching which is contingent on what learners do requires that teachers give learners the necessary autonomy particularly when they are making good progress. When learners experience difficulties, however, teachers should offer increasing degrees of help (Darling-Hammond, 1993).

Critical thinking, on the other hand, refers to the use of cognitive skills or strategies that increase the probability of a desirable outcome. Critical thinking is purposeful, reasoned, and goal-directed. It is also involved in solving problems, formulating inferences, calculating likelihoods, and making decisions (Mandernach et al., 2009). Relevant instructional strategies are necessary to foster higher-order critical thinking. Instruction in critical thinking should be designed to achieve an understanding of the relationship of language to logic, which should lead to the ability to analyze, criticize, and advocate ideas; to reason inductively and deductively; and to reach factual or judgmental conclusions based on sound inferences drawn from unambiguous statements of knowledge or belief (Dumke, 1980). The development of student-centered learning and critical thinking requires that learners are given an individualized adequate time necessary for mastering the learning process. Albeit the time-limit constraints of a scheduled class period in the traditional

classroom, the asynchronous structure of online learning, however, allows learners the time necessary for individualized reflection, investigation, and inquiry. Nevertheless, the key to promoting students' critical thinking lies with instructor interactivity. How the instructor facilitates and encourages the discussion to prompt higher-order thought is more important than the delivery style or discussion mode (synchronous or asynchronous). Instructors who actively engage their students promote advanced understanding over classes that allow students to be passive consumers of information. In a traditional classroom, instructor interactivity includes, but is not limited to, his or her physical presence in the classroom, the physical proximity of the instructor and learners, facilitating a discussion, posing questions, challenging answers, providing insight, and engaging students as part of the natural discussion process. In contrast, logging into the online class and monitoring the discussion threads do not automatically give students the impression of interactivity or engagement, the instructor should rather leave visible evidence of participation (Mandernach et al., 2009).

Active learning and constructivist educational strategies, among others, are very important to push students toward higher-order thinking processes (Halpern, 1999). The discussion questions and discussion facilitation strategies are the key instructional components of a discussion within the direct control of an instructor. Therefore, the discussion questions should not only be tied directly to the content of the course but should also be student-centered and relevant to the lives and interests of the students to maximize student engagement and participation in the discussion (Mandernach et al., 2009). Creativity is a complex psychological phenomenon that can be expressed and understood from the perspectives of ability, thought and personality characteristics, learning process as well as creative achievements. The value of stimulating development and nurturing creativity in the learning context is inherent and closely connected with the quality of learning, problem-solving, innovation, and overall social development (Zuljan et al., 2010).

The (internal) motivation, cognitive, personality, and social factors, in addition to intelligence, knowledge, style of thinking, personality, and the environment are the key factors that contribute to the development of creativity (Jurišević, 2010). Apart from knowledge and skills in a particular field, motivation is one of the key factors of creativity which is significantly more changeable and dependent on the given situation or the concrete learning context (Hennessey, 2007). The examination of the relationship between motivational stimuli (such as internal motivation, reward, and competition) and creativity shows that motivational orientation either stimulates (when it is derived from the individual's internal attributes) or hinders (when it is derived from the individual's environment) creativity and creative learning (Sternberg, 2006).

The role of external motivation in stimulating creativity is positive in situations wherein individuals receive positive feedback about their competence and when the learning situation becomes more interesting due to external stimuli. External motivation, however, has a negative role when the feedback about the learners' competence is negative and in cases where the external stimuli represent a means of limitation and control (Hennessey, 2007). Motivation does not only influence cognitive and metacognitive processes but also stimulates higher forms of thinking and determines individuals' attitudes and approaches to learning and activities that lead to (learning) creative achievements (Juriševič, 2010). According to Rheinberg et al. (2000), motivation influences learning on three main levels: (1) the level of the time that is dedicated to learning or to learning tasks, both in the sense of the extent (duration) and frequency of the execution of learning activities, (2) the level of the forms or nature of the learning activities and strategies that will stimulate learners to effectively achieve learning goals (superficial learning or learning for understanding), and (3) the level of the learners' functional disposition, based on the optimal psychological state during learning. Furthermore, external motivational orientation includes attributes of the environment, such as grades, rewards, or social acceptance which encourage learners to learn. On the other hand, learners may experience learning passively, incompetently, and develop negative emotions toward learning or purely for instrumental or pragmatic reasons. It is, therefore, essential that teachers know how to recognize motivation or the motivational orientation of the individual learners and also know how to stimulate pupils to learn and undertake creative work concerning their motivation (Juriševič, 2010).

Well-structured and precise instructions significantly enhance creativity in learning tasks rather than loose and less-structured instructions (Jokinen & Mikkonen, 2013). From a socio-cultural perspective, an increase in active participation significantly enhances the formation of a motivational predisposition to learning (Schunk & Zimmerman, 2013). In addition to a creative environment, teachers should be well-acquainted with the use of various pedagogical approaches, irrespective of the subject area, to encourage learners' creativity during instruction (Jokinen & Mikkonen, 2013).

Conclusion

There are uncertainties about the future impacts of the pandemic on teaching and learning practices and the possibility of returning to normal face-to-face settings. It is also axiomatic that learners differ from one another. As a consequence, and especially in virtual and online environments, teaching approaches should differ according to the individual learner because one size does not

fit all. Contemporary education and training have become a process where learners are expected to be involved in planning what is to be learned, how, and when as well as how the learning will be assessed rather than being almost entirely instructor- and provider-controlled. The benefits of personalized instruction can be best perceived with its enhancement of advanced understanding, self-confidence, liking, usefulness, and motivation to think critically with a low level of anxiety when learners are actively engaged by the teachers. It also enables deep learning rather than the acquisition of a few skills. Personalized learning might necessitate activities such as the reorganization of teaching assistants, learning mentors, and administrative staff to provide more flexible support to individual learners and small groups as well as extending alternative curricular pathways and work-related provision to increase opportunities for all learners. Thus, the key to promoting students' critical thinking lies with instructor interactivity. How the instructor facilitates and encourages the discussion to prompt higher-order thought is more important than the delivery style or discussion mode (synchronous or asynchronous). It is, therefore, essential that teachers know how to recognize motivation or the motivational orientation of every individual learner and also know how to stimulate pupils to learn and undertake creative work concerning their motivation. An increase in active participation also enhances the formation of a motivational predisposition to learning. Though a creative environment is ideal, nevertheless, teachers should be well-acquainted with the use of various technological innovations and pedagogical approaches, irrespective of the subject area, to encourage learners' creativity during instruction. The execution of such a synergistic student-centered and personalized teaching that considers the psychological, psychosocial, and socio-cultural backgrounds of learners in a more holistic perspective would inevitably require multi-disciplinary collaboration from innovators, entrepreneurs, regulators, payers, and policymakers as well as teachers, anthropologists, psychologist, and sociologist.

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ORCID iD


Idris Adewale Ahmed https://orcid.org/0000-0002-2215-3900

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Author Biographies

Idris Adewale Ahmed is a Research Fellow at the Centre for Natural Products Research and Drug Discovery, Universiti Malaya. He is also attached to Lincoln University College, Malaysia as an experienced Senior Lecturer with a proven track and demonstrates excellent teaching and research outputs. He is interested in outcome-based and student-centered education. He is a biotechnologist and health scientist with over 10 years of experience in the natural products and wellness sectors. He regularly contributes to issues of national discourse in national dailies such as the New Straits Times and The Star.

Maryam Abimbola Mikail previously worked as a Lecturer at Lincoln University College, Malaysia. She is interested in teaching the science and art of skincare and healthy aging. She is the founder and CEO of MIMIA SDN. BHD. (https://mimiaskincare.com/). She also occasionally contributes to national discourse issues in national dailies such as the New Straits Times and The Star.