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# Teaching and Learning During a Global Pandemic: An Ecological Approach

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**ABSTRACT**

This paper proposes a conceptual framework for online teaching and learning during a global crisis, such as the health crisis created by the COVID-19 Pandemic in the year 2020. The paper argues that adopting a combinatorial, ecological approach including five types of affordances, i.e. cultural, social, technological, cognitive and affective affordances can be instrumental in improving the process of teaching and learning in an online learning environment. The authors believe that through proper training, teachers can become more heedful of and knowledgeable about the five types of affordances that the online ecology of learning and teaching offers and can exploit them to deliver better lessons and develop and conduct more practical assessments. It is likewise suggested that students can enjoy better learning experiences, if through proper orientation and preparation, they gain the requisite knowledge about, and master the relevant skills in, identifying and using the relevant affordances in the online learning ecology. In addition, it is proposed that course-related surveys conducted throughout and at the end of each course can provide significant insights as to the availability and applicability of the affordances provided in the online learning environments. Finally, due to the distinctively complex nature of the online ecology of learning and teaching, the authors consider it of paramount importance to provide ongoing advising services for teachers and students alike in the five areas of affordances discussed in this paper.

## Introduction

In March 2020, the World Health Organisation (WHO) announced that "COVID-19 can be characterized as a pandemic". (World Health Organisation, 11 March 2020). Ever since, the far-reaching effects of the pandemic have been felt in nearly all sectors of most countries in the world. Likewise, the education sector has been immensely affected, because in order to prevent the spread of the disease, schools and universities in many parts of the world have had to close down, and teaching take place online at primary, secondary and tertiary levels. While the pandemic broke out at a juncture when most countries in the world had the appropriate technological infrastructure to move to online teaching, the change itself has had varying implications primarily for students and teachers, as well as for schools, universities and the relevant institutions and regulatory bodies. The Coronavirus Pandemic did not merely change the mode of teaching from face-to-face to online mode, but it also changed the nature of pedagogical approaches to both teaching and testing. While most teaching began to take place online after the official announcement of the pandemic by the World Health Organization, the lived experiences of students and teachers have changed to the extent that both groups have had to adopt and adapt new ways of coping with the requirements of the new world reality. This new reality is not merely based on the way that teachers and students interact with each other, but also, the entire ecology of teaching and learning has had to undergo



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significant adjustments and transformations.

During the current pandemic, most students have had to attend online classes, while their sibling(s) have probably also had to study online at the same time in the same household. This seemingly simple change has meant that suddenly the home environment is required to accommodate the different spaces, internet access and other relevant needs of those members of the family who have had to study online. The closure of schools and universities has also meant that some parents have had to stay at home to look after their children, who would otherwise have been at school. In short, the changes and the speed with which they occurred have been overwhelming for most families. As for teachers, they have had to make sure that the lessons they teach are as effective as face-to-face teaching and have had to plan activities that are more suitable for online teaching and develop assessments that can be administered efficiently in the current online learning environment. In short, all aspects of teaching have had to be reviewed and revised according to the new mode of delivery, including the process of lesson planning, teaching, assessing students' work and providing feedback as well as running end-of-term assessments. In essence, the COVID-19 pandemic transformed the "ecology" of teaching and learning into one with its own characteristics and attributes. The aim of this paper is to examine the features of this new ecology and to ask the question: What affordances can facilitate student learning in this new environment?

**What are Affordances in the Ecology of Teaching and Learning?**

Ecological approaches to learning and the concept of ecological psychology gained prominence after the introduction of the concept of affordances by Gibson in 1979. Gibson defines affordances as:

> The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. The verb to afford is found in the dictionary, but the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment. (Gibson 1979, p. 127)

This broad definition of affordances reveals that each organism may act upon the environmental possibilities, present in their ecosystem and use them according to its wishes and needs. In ecological psychology, the interaction between the individual and their immediate environment can lead to the idiosyncratic manifestation of phenotypic comportment, i.e. actions and behaviours that are uniquely characteristic of each person (Ramstead, Veissière & Kirmayer, 2016). In the specific context of the ecology of teaching and learning, for example in a second language class, students are offered the possibility of using new words to write a short paragraph or essay in order to express their views on a given topic. While all students are offered the same new words, the way each student uses the words to express themselves is distinctive and as such is indicative of the individual student's preferences and ability to use the linguistic affordances.

Correspondingly, the concepts of "Ecology of Language Learning" (ELL) as proposed by Leo van Lier (2008, 2010 and 2011) and "online collaborative learning" by Wang Fang & Gu (2020) denote a significant shift in the theoretical perspectives regarding teaching and learning approaches. This approach, on the surface, might appear identical to the sociocultural theory (SCT) of language learning as suggested by some second language acquisition (SLA) researchers – see, for example, Lantolf (2000), Lantolf & Poehner (2014), Lantolf, Poehner & Swain (2018). However, the two approaches are not to be equated as they start out from historically different origins and seek to explore different aspects of learning and teaching. In the current educational scenario, adopting an ecological approach to teaching is more likely to constitute an all-encompassing pedagogical practice that can more fittingly define and meet the needs of students and teachers alike. This is purely owing to the fact that during a pandemic similar to the one that the world is experiencing presently, educational institutions and teachers will have to resort to and utilise specific types of affordances that are unique to the current ecology of learning and teaching, which can help the students achieve the relevant learning outcomes for different courses. Therefore, in the light of the specific requirements of teaching and learning in the current pandemic, the following combinatorial model of affordances is suggested, which includes cultural, social, technological, cognitive and affective affordances.



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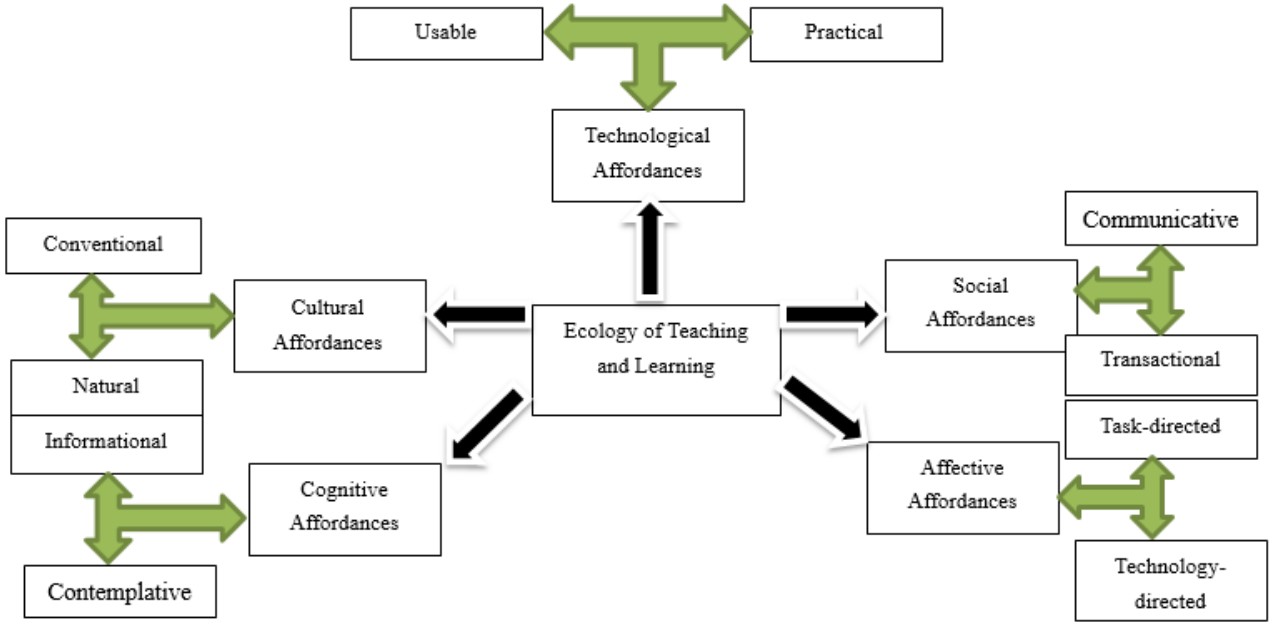


***Figures 1:*** *The Ecology of Teaching and Learning and the Relevant Affordances*

The use of a combinatorial model is decisive due to the complex nature of the present pedagogical scenario and its requirements. In the following sections each type of affordance and its different aspects will be explored.

**Cultural Affordances**

Ramstead, Veissière, & Kirmayer (2016, p.3) define cultural affordances as "The kind of affordance that humans encounter in the niches that they constitute. There are two kinds of cultural affordances: natural and conventional affordances." They distinguish between these two types of cultural affordances:

We propose to distinguish two kinds of cultural affordances: 'natural' affordances and 'conventional' affordances. Natural affordances are possibilities for action, the engagement with which depends on an organism or agent exploiting or leveraging reliable correlations in its environment with its set of abilities. For instance, given a human agent's bipedal phenotype and related ability to walk, an unpaved road affords a trek. Conventional affordances are possibilities for action, the engagement with which depends on agents' skillfully leveraging explicit or implicit expectations, norms, conventions, and cooperative social practices. Engagement with these affordances requires that agents have the ability to correctly infer (implicitly or explicitly) the culturally specific sets of expectations in which they are immersed—expectations about how to interpret other agents, and the symbolically and linguistically mediated social world. (Ramstead, Veissière, & Kirmayer, 2016, p.2)

Within the ecology of teaching and learning, students from a specific sociocultural background encounter and exploit both natural and conventional affordances: the former constitutes what is permissible culturally and the latter requires the students to skilfully master and exploit what their culture affords them. While natural affordances constitute a set of cultural prescriptions and proscriptions, conventional affordances require the student to competently employ the possibilities for action in their learning context. For example, referring to female students by first name, might be frowned upon in some countries, and the language used to refer to female students might need to be more formal in comparison with the language used to refer to male students. This cultural convention affords certain interactional (im)possibilities which should be allowed for in order for the lesson to flow efficiently. Rietveld & Kiverstein (2014, p.15) "… suggest that what matters for successful coordination with the activities of others is that one can reliably act in ways that fit in with a socio-cultural practice or communal custom, but also with the specific details of the particular situation in which the activity is taking place."

Without a doubt awareness of cultural affordances and the way they could be put into use can help teachers design lessons and assessments that are culturally relevant and appropriate. This is even more manifestly clear in online classes



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which are filled with culturally significant characteristics, where the professor can mostly rely on the possibilities that teaching and testing online affords. Similarly, Ramstead, Veissière, & Kirmayer (2016, p.13) maintain: "The everyday phenomenology of affordances is one of possibilities for action and their variations; in other words, of *expecting* certain nested action possibilities and prescriptions for action." Undoubtedly, any teacher who has taught in different sociocultural contexts is aware of such culturally meaningful variations and the possibilities of action or otherwise. Taking into account these cultural affordances can better equip the teacher to design culturally appropriate lessons and activities which meet the specific ecological and contextual requirements of the students.

**Social Affordances**

A social affordance is "the relationship between the properties of an object and the social characteristics of a given group that enable particular kinds of interaction among members of that group" (Bradner, 2001, p. 2). Social affordances are communicative opportunities for humans to interact with each other and achieve communicative and transactional functions of speech. On daily basis, we do interact socially and also to get things done (Ferri, Campione, Dalla Volta, Gianelli, & Gentilucci, 2011). Wellman, Quan-Haase, Boase, Chen, Hampton, Díaz, & Miyata (2006 ; 2003) suggest that technological changes create social affordances and opportunities and possibilities for social interactivity. This is because through the use of technology, we can stay connected in a personalised and even globalised manner. They further argue that the use of the technology and internet in particular can transform and add positively to communities (Wellman *et al.* 2006).

Clément & Kaufmann (2007) believe "social affordances …. are immediately recognizable: they allow socially competent individuals to see what is the right, appropriate thing to do in any given circumstances." In online teaching, the possibilities for interaction are of an unusual social and interactive nature and fairly limited in scope. Allowing for and designing social affordances and opportunities for more interaction between the students and completing collaborative work together is a feature of principal importance in online classes. Activities should be designed based on socially acceptable norms and in accordance with the goals of each lesson. For instance, if students are hesitant to switch on their webcams and microphones during an online class due to social norms, a set of activities which provide socially relevant affordances should be designed, which encourage students to collaborate with the others in their class to complete the relevant pedagogical tasks. Nevertheless, as van Dijk & Rietveld (2017, p.2. ) maintain: " to understand how we respond to affordances offered both by material aspects of the environment and by other people, it is crucial that we understand the practical situation in which such behavior occurs." Undoubtedly, in the existing world situation and educational landscape, technology plays a significant role in shaping and eliciting our students' behaviour. This will be discussed in the next section.

**Technological Affordances**

Bobsin, Petrini, & Pozzebon (2019) define technology affordances as "the technology potential that comes from a goal-oriented behavior and that turns into concrete actions. Affordances only exist in practice and in context. The very same technology might have different potentialities when considering different situations." (p.15). It is generally believed that technological affordances provide students with more possibilities and opportunities for action, i.e. interaction with their teachers, counsellors or other fellow students. Similarly, Davis, & Chouinard, (2017, p.241) argue "… affordances are the dynamic link between subjects and objects within sociotechnical systems." However, there is some research evidence to indicate that technological affordances are not always effective and can be counterproductive as far as interaction is concerned (See for example, Stommel & Molder, 2015). Therefore, it seems pedagogically viable to rigorously evaluate technological affordances based on the specific needs of the learners and in accordance with the particular socio-cultural and educational context in which they are studying (Lainema, Lainema, Hämäläinen, & Heinonen, 2019). In the ecology of the current pandemic, technological affordances can only be employed and put into use effectively if they meet the requirements of other types of affordances for the students (Shin, 2017). Technological affordances should be designed in such a way that they are both student and teacher friendly and provide an interface which lends itself to meaningful engagement and mastery of skills. An application or a technological platform that does





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not meet this requirement or that cannot be used effectively at any point in time of teaching and assessing students should be re-adjusted or modified according to the needs of the students, primarily, and then of the teachers. Technological affordances can only become usable if they are evaluated and their use adjusted in a specific setting and based on the nature of the tasks students need to complete. Similarly, Said, Tahir, Ali, Noor, Atan, & Abdullah (2014) believe successful teaching and learning in an e-learning environment "requires preparation in terms of technology and tools, collaborative learning tasks, and collaborative learning approach." (p.3659). Thus, while technological affordances might have some design features that could provide some action possibilities for use in the classroom, pedagogical tasks need to be planned in such a way that students and teachers can use the intended technological affordances effectively; this is an important attribute that relates to cognitive affordances and will be discussed next.

**Cognitive Affordances**

Hartson (2003, p.319) argues that "A cognitive affordance is a design feature that helps, aids, supports, facilitates, or enables thinking and/or knowing about something." In the ecology of teaching and learning, the design features of the online learning environment should dovetail closely with cognitive-educational objectives outlined in Bloom's Taxonomy (Anderson & Krathwohl, 2001). Thus, cognitive affordances provided in the ecology of online teaching and learning should comprise such a framework and provide possibilities and action opportunities for students to specifically engage in the cognitive processes of remembering, understanding, applying, analysing, evaluating and creating (Anderson & Krathwohl, 2001). Such an approach clarifies and justifies the use of particular affordances and can thus help teachers create tasks and activities that are more meaningful and motivating for the students.

Dabbagh, Mason & Dass (2014) argue that through evaluation and analysis of cognitive affordances in learning environments, different technological platforms are used as part of the lesson planning and teaching strategies. They further argue that through the use of appropriate cognitive affordances and training faculty members, students will benefit from better "learning experiences" (p.411). Similarly, Sarathy, Oosterveld, Krause & Scheutz (2018) contend that design features can provide cognitive affordances beyond the obvious ones and argue that …. "this class of cognitive affordances is deeply influenced by contextual and normative factors including goals and intentions, prior knowledge and interpretations, ensemble scene information, mental state, experience and developmental state, social and moral conventions, and aesthetic considerations among others (p.2). Therefore, students' ability to use the cognitive affordances provided in the online learning environment, in particular a technologically-enhanced one, largely depends on the initial orientation and preparation of both the teacher and the students. The teacher should be fully conversant with the cognitive affordances and link them clearly to the relevant cognitive function(s). Likewise, the students should be able to understand the instructions that each task requires of them. The facility with which students are able to make use of the cognitive affordances can have marked effects on the affective affordances of the design features of the online learning environment.

**Affective Affordances**

The last set of affordances envisaged in the ecological model proposed in this paper, are affective or emotional affordances. Emotional affordances relate to the emotional responses that design affordances provide for each individual. Emotional affordances are unique to the individual and are context dependent. That is to say, different students might react emotionally differently to certain features of the online learning environment. Hufendiek (2017, p. 4472) argues that "emotional affordances are constituted by relational properties that are of instrumental value to the organism." Park & Lim (2019) argue that designing emotional affordances can help improve students' emotional responses in an online learning environment (p.54). They argue that students might feel lonely, anxious, bored or even frustrated in an online class and designing appropriate affective affordances can play a significant role in helping them enjoy the online interaction, develop empathy with the students and improve the students' emotional competence. Similarly, Cheng (2014) states:

> Emotional affordance pertains to how emotion-related processes or behaviour of a user are elicited (or suppressed), expressed (or inhibited), perceived, and managed. The emotion can be self-directed or others-directed, towards specific academic tasks or the learning environment (Wosnitza & Volet, 2005). The





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affordance as a property of the learning environment is itself neutral but the actual emotional outcomes can be positive or negative, intended or unintended, depending on the learner characteristics and the learning context. (p.42).

Wosnitza & Volet (2005) in a study of different types of emotions students experience in an online learning environment highlight the importance of emotion in relation to different aspects of the online learning environment such as self-directed emotions, task-directed emotions and technology-directed emotions. These emotions reveal how students appraise these aspects of their learning and develop emotions accordingly. The authors argue that emotions play a significant role in students' learning and highlight the importance of the teacher's intervention in mitigating negative emotions. Doubtless, a student who finds it difficult to understand a given lesson might be rendered unable to complete the relevant tasks due to the large amount of anxiety s/he might experience and might be rendered unable to gain the requisite knowledge and skills envisaged as being the learning outcomes of the lesson. The ripple effects of such a negative experience and the concomitant negative emotions are multi-faceted, and it is only through planning the right type of emotional affordances and interventions that the teacher can ensure that the student does not feel helpless and powerless in the online learning environment. Such a state of mind will have significant consequences for the learner: positive learning experiences characterised by clarity of instructions and students understanding what they are supposed to do in the online learning environment will likely lead to the student's positive evaluation of and response to the online learning experience. However, negative learning experiences created because of ambiguity and a feeling of being lost in the obfuscating labyrinth of a given lesson and activities will add to the student's feelings of anxiety and negative emotional attitudes towards the learning experience. As Morie, Williams, Dozois, & Luigi (2005) maintain: "Emotions are implicated in our phenomenological understanding of the physical world, and therefore we surmise they play the same integral role in our experience of a virtual one. In addition, an abundance of recent research points empirically to the interconnectedness of emotions, cognition, learning and behavior, indicating that emotions cannot be easily dismissed when focusing on pedagogical goals." (p.2). Therefore, it is important to consider the affective affordances of the online learning environment and the concomitant emotions that they might arouse as significant components of the online ecology of learning and teaching.

**Conclusion and Recommendations**

As argued in the preceding paragraphs, in the ecology of learning and teaching, the five types of cultural, social, technological, cognitive and affective affordances are closely related to one another and can work inter-dependently to create a pleasant and effective learning environment. Doubtless, adopting an ecological approach in the context of a global crisis and allowing for the relevant affordances can yield better results if only teachers receive rigorous training in the five areas discussed in this paper. In addition, students should also receive both training and ongoing support to ensure that they have the requisite awareness and knowledge about different types of affordances. Such an approach provides students with a learning experience that is culturally appropriate with the inclusion of acceptable, interactive social affordances, free from uncertainties and anxieties about the use of different features of the online classroom and will lead students to use the affordances of the learning environment more efficiently and effectively. It might be argued that the Covid-19 crisis and its effects could be considered as an anomaly that is unlikely to recur almost inconceivably. However, it could be safely posited that an ecological approach can be considered the right methodological approach for times of crisis more generally, when the status quo hampers the usual educational endeavours of institutions, and reduces the teachers and students' face-to-face interaction and engagement in completion of tasks in schools and universities. Thus, adopting such a combinatorial approach to teaching in the existing ecology of learning and teaching can help teachers and students alike in being better prepared to successfully achieve their respective goals. Such an approach certainly needs to be adjusted and amended based on the specific needs of times, but in essence, it can furnish us with a comprehensive and sound, interventional approach to enable us to continue to improve educational processes, irrespective of the existence of the seemingly insuperable obstacles. In order to create ecologically effective learning environments, it is important to conduct surveys throughout and at the end of a course on teachers' and students' perceptions of affordances, their usability and effectiveness. Such data can help create a link between the use of the existing affordances and students as well as





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teachers' needs. Finally, it is also of great importance to provide counselling services related to the use of the five types of affordances explored in the model proposed in this paper. It is only through adopting an ecological approach that the seemingly tortuous path of online education can be more effectually and successfully mapped out, and this marks the beginning of the educational journey for many in the coming years, if not decades.

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