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Research Article

Self-Directed Learning Skills of Undergraduate Physiotherapy Students: A Cross-Sectional Survey

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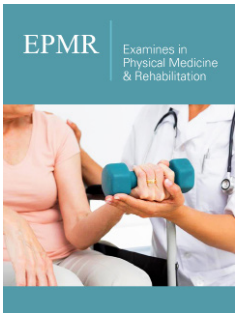

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Abstract

Background: Self-Directed Learning (SDL) is an important form of adult learning and is at the core of undergraduate medical education. SDL skills and technology readiness are postulated as integral factors influencing individual behavior and academic performance in blended learning contexts. So far, the predominant instructor-led face-to face learning approach in traditional learning environments has not considered the importance of these factors. Recently, strict nationwide lock down for the COVID-19 closed educational institutions and ushered in online learning to continue learning. Students are facing uncertainties in the online learning context and need to adjust or formulate their own best learning strategies to suit this newly adopted model of 'self-directed learning with technology'. Therefore, this study aimed to determine the SDL skills of Physiotherapy students.

Methodology: A cross-sectional online survey was conducted in undergraduate physiotherapy students. A semi-structured questionnaire was developed considering multiple dimensions of SDL skills and assessed students' perception of their own SDL skills. 227 students voluntarily participated.

Result: Majority of the Physiotherapy students possess the fundamental qualities of SDL skills. However, students found it difficult to adapt to a new learning situation and expressed a sense of discomfort and insecurity in using online learning platforms. The other domain with low perceived skills was 'self-control' where students mentioned lack of focus, inconsistency in efforts and difficulty to overcome procrastination.

Conclusion: This study helped to identify aspects influencing students' learning processes from their own perspectives and provided valuable insights into the special needs and behavior of students in the context of COVID-19 lockdown. Students' perceived difficulty in their adaptation to online learning methods highlights the need for prior training with learning platforms, and a change in pedagogical approach.

Keywords: Self directed learning skills; Physiotherapy education; Online learning; Covid-19 lockdown

Abbreviations: SDL: Self-Directed Learning

Introduction

Blended learning creates a rich educational environment with multiple technology-enabled forms in both face-to-face and online teaching [1]. In the higher education context, effective integration of face-to-face and internet technology components determines the quality of course design and is the hallmark of effective education. Apart from educational technology strategy and structure, students' characteristics are closely related to the learning effectiveness in a blended environment. Amongst many student characteristics, Self-Directed Learning (SDL) skills and technology readiness are postulated as integral factors influencing individual behavior and academic performance in blended learning contexts [2].

You learn at your best when you have something you care about and can get pleasure in being engaged. Howard Gardner

Self-directed learning is an important form of adult learning. In its broadest meaning, SDL describes 'a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes' [3]. In defining SDL, two aspects need to be explored: Firstly, SDL as a process or method of learning [3,4], and secondly, personality characteristics that are

required and developed as an outcome of SDL [5,6]. Knowles [7], described two opposite poles of a continuum of learning, with teacher- or other-directed (pedagogical) learning at one end and self-directed (andragogical) at the other. According to Knowles (1990), the pedagogical learner is dependent on the teacher to identify learning needs, formulate objectives, plan and implement learning activities and evaluate learning. The pedagogical learner prefers to learn in highly structured situations such as lectures and tutorials. Conversely, the andragogical learner prefers to take responsibility for meeting his or her own learning needs. The continuum of teacher-versus self-direction can be described in terms of the amount of control the learner has over their learning and the amount of freedom given to them to evaluate their learning needs and to implement strategies to achieve their learning goals.

Learning preferably, should be self-initiated, with a sense of discovery coming from within [8]. Ideally, as learners mature, they move from a self-dependent personality towards one of self-direction and autonomy. Self-directed students have a stronger willingness to achieve learning goals and are anticipated to involve in learning activities more actively. Our role as educators is to enhance the ability of learners to be self-determined in their studies and foster motivations for learning that are internal than external.

Technology readiness is another critical dimension connected with students' learning in the blended environment [9,10]. It is defined as 'people's propensity to embrace and use new technologies for accomplishing goals in home life and at work' and can have both positive and negative facets [11]. Students with higher levels of technology readiness hold a positive attitude toward technological learning media and innovative platforms for communication. While students with a sense of discomfort and insecurity in adopting technologies may take a longer time to become efficient users of online learning platforms.

In the world of technology, familiarity and proficiency with technological tools became pivotal to complementing self-directed learning styles [12]. Thus, taken together, it can be hypothesized that the students who are more self-directed and with active attitudes toward technology-based products are more motivated in adopting online learning strategies and achieving their learning goals. With this perspective, integrating technology can be anticipated to enrich the traditional classroom learning by fostering SDL skills.

Context of the Study

According to the most recent recommendations, SDL is at the core of undergraduate medical education. Many universities are now placing specific emphasis on the development of SDL or lifelong learning skills as one of the primary goals of university education. SDL is an essential proficiency skill for medical practitioners and as such has been adopted by many medical schools as a part of curriculum. SDL is an efficient and effective learning tool and multiple modalities in educational practice can be used for providing SDL instruction such as problem-based learning, group discussions, etc [13,14]. SDL is considered to be the most appropriate educational approach to enhance life-long learning as it enhances self-efficacy [15].

Students' perceptions of SDL to a certain extent reflect the learning effectiveness and learning experience of students in a course. However, these relationships are dynamic in different learning settings and need further exploration. At K J Somaiya College of Physiotherapy, the curriculum is a 4.5-year program with the course divided into 4 academic years. The curriculum is pre-determined with clearly defined learning objectives of each course according to an established time frame. It has a classroom-setting approach with all the learning activities guided and supervised by one or more instructor/s. A variety of instructional approaches and a number of learning activities, resources and workshops are offered to help students build up their repertoire of SDL strategies. It is expected that the components of hybrid curriculum may encourage students' self-directed learning; however, the curriculum is still not free from teacher-centered culture as the teachers have high power in deciding the learning process. Also, assessment and/or training focused on SDL is not yet a component of existing curriculum or course design. Further investigation is needed to verify the actual level and readiness of students' SDL. Furthermore, it is likely that students will have varying levels of competence and confidence with self-direction, especially those who spent years in a learning context that was dominated by a teacher-directed approach to learning.

SDL is considered to be a 'Learner-centered approach' with 'Critical reflection' as an intrinsic component of the process. However, with the existing predominant instructor-led approach, students may not be able to identify the strategies of SDL in which they are strong or weak. Recognizing the deficiencies in their SDL skills will help the students use the available resources effectively. Therefore, the purpose of this study is to help students identify their strengths and weaknesses in SDL strategies, from their own perspectives. More specifically students' personal factors such as their own intentions, attitudes and abilities are the main focus of this study.

Rationale for the Study

It is assumed that the ability to learn independently in one situation or context can be generalized to other settings [16,17]. According to Candy [16], learners may have a high level of self-direction in an area in which they are familiar, or in areas that are similar to a prior experience [16]. However, it would be inadvisable to assume that a person who possesses high levels of readiness for self-direction in a given situation would still possess the same amount of readiness in a new, unfamiliar context. Learners may exhibit different levels of self-direction in different learning situations due to different levels of academic self-concept. It is therefore important that measuring SDL readiness needs to be done within a specific context.

Readiness for SDL is individualized, which accounts for the varying degrees along the continuum. The Staged Self-directed Learning Model was developed to allow for the individual differences inherent in such a continuum [18,19]. In evaluating self-directed independent study contracts with undergraduate nursing students, identified that a negative experience resulted from either

over-direction or under-direction from the teacher [20]. Evidence has found that those students who have low readiness for SDL and are exposed to a SDL project, exhibit high levels of anxiety, and similarly those learners with a high readiness for SDL who are exposed to increasing levels of teacher direction also exhibit high anxiety levels [18,21].

Physical Therapy (PT) practice requires self-determined, professional clinical decision making in the face of an ever-increasing body of knowledge [22]. Traditional classroom training is the pervasive pedagogic approach and E-learning has remained in the periphery of educational delivery in Physiotherapy programs [23]. There is a concern that traditional instruction-based methods of learning do not adequately prepare students for the challenges of physical therapy practice [24], and it has long been acknowledged that other modes of learning are needed in PT education [25]. Recently, strict nationwide lock down for the COVID-19 closed educational institutions and ushered in online medium to continue learning. Based on the previous literature, SDL and technology readiness can impact learning motivation, and drive learning behavior of students in blended learning environments [26]. Also, some preliminary evidence suggests that these factors have different predictive values on learning effectiveness among online and blended learning contexts [27]. So far, the predominant instructor-led face-to face learning approach in traditional learning environments has not considered the importance of these factors. It is becoming evident that adoption of the new domain of instructional delivery -web-based medium during COVID-19 lockdown has inherent difficulties in terms of student characteristics. Students are facing uncertainties in the online learning context and need to adjust or formulate their own best learning strategies to suit this newly adopted model of 'self-directed learning with technology'. Research exploring online learning has indicated that SDL skills may assist the learner with the learning process in these contexts [28]. Therefore, it is important to identify university students' SDL skills, to offer support and guide students' behavior in the given scenario.

Thus, this study aimed to determine the self-directed learning skills of undergraduate Physiotherapy students in online context with specific objectives outlined as

Primary objectives

To identify the areas of strength in self-directed learning skills of undergraduate Physiotherapy students from I year -IV year

To identify the weak domain/s of self-directed learning skills of undergraduate Physiotherapy students from I year -IV year

Secondary objective

To determine the relationship between self-directed learning skills and year of study (comparison between I year to IV year)

Research question

To achieve the objectives of this study, the following core research question was formulated to guide the study:

Do undergraduate Physiotherapy students have self-directed learning skills? What are the areas of their strength and weakness in self-directed learning?

Research Hypothesis

Not applicable

Literature Review

The literature search conducted for the present study reviewed existing perspectives on SDL and included articles published online only. Although there is an emerging literature in physiotherapy, the research is primarily from medical education. Some conclusive findings are as follows:

The concept of self-directed learning has undergone thorough consideration over the last years and a variety of perspectives on SDL exist and researchers with different foci attempt to model how cognitive, meta-cognitive, motivational, and contextual factors influence the learning process. SDL is well defined in higher education as a learner-centered approach and is an important attribute of lifelong learners as it enhances self-efficacy [3,16]. SDL and information and computer technology utilization are related in many ways in learning context [1,11,29].

SDL skills assessment and training are widely adopted in many medical schools. SDL as a learning tool is implemented using many diverse approaches and teaching modalities [30-34]. Outcome measures used include qualitative and quantitative tools [35-43]. Questionnaires are limited. Some questionnaires are generic for adult learners such as Guglielmone (1977) 'Self-Directed Learning Readiness Scale' (SDLRS) [35]. Other instruments are adopted for specific disciplines such as Fishers' self-directed learning readiness score instrument for nursing education [37]. The instrument most widely used in educational and nursing research to measure SDL readiness is (SDLRS) [38,44-46]. SDL being difficult to assess using direct measure tools; quantitative methods have been reported in very few studies. These studies have used formal assessment tools administered by faculty and include varied criteria of standards. Not much empirical evidence is available in the extant literature in Indian Physiotherapy education and there is a need for Physiotherapy-specific research. Thus, the present study intends to fill this gap in the literature.

Methodology

It was a cross-sectional descriptive study conducted during COVID-19 lockdown period (May 2020). Ethical approval was obtained from the institutional review board of K J Somaiya college of Physiotherapy, India. All the undergraduate Physiotherapy students (I -IV-year BPTh.) enrolled in this academic institute were invited to participate in an online survey. We included students for the same institutional background for better control of the survey. We collected qualitative responses from students about their perception in studies in the current academic year. During the time of data collection, most of the teaching portion was completed and students were engaged in studying for and taking university exams in the upcoming month. Participation in the study was voluntary

and electronic consent was obtained from the participant. Students' unwillingness to participate and students who were transferred recently from other institutes were set as exclusion criteria. Sampling method was non-randomized, convenient and the target population is representative of students available on social media platforms. Sample size was not estimated prior to the study; however, a maximum number of participants was desirable as well as anticipated in view of relevance of this topic to students in the current situation; and the beneficial use of social media as a method of data collection.

A questionnaire was developed de-novo as a part of this study. This is a self-report measure and students were asked to reflect on their SDL skills. Basic demographic details included age, academic year, and some additional information on computer skills, internet use, etc. The questionnaire is designed considering multiple dimensions of SDL skills as evident in the literature. The literature was extensively surveyed to compile a list of attitudes, abilities and personality characteristics of a self-directed learner. The questionnaire is semi- structured and has a combination of open and close ended-questions (includes multiple choice and ranking Likert-scale style questions). The questionnaire is in English language. Content validity of the questionnaire was established from two experienced teachers. The questionnaire was distributed to the participants as Google forms via social media on WhatsApp; and was emailed, if requested by them. Link to the forms was available to them for seven consecutive days. Reminders were sent to ensure maximum participation. Data thus collected was subjected to analysis. This questionnaire can be used with permission from the corresponding author and appropriate citation of study.

Data Analysis

Descriptive statistics (percentage and frequency distribution) was performed. Open ended responses were analyzed through thematic analysis. From this multidimensional questionnaire, the areas where students are performing well and the areas where they might be lacking were identified. Preliminary data analysis was conducted to determine if the academic year of students influenced the results (as mentioned in secondary objective). Comparative analysis of academic year-wise four different groups revealed no significant difference, so all the participants were treated as a single group.

Result

Out of the 280 forms distributed, 227 students submitted the filled forms yielding a response rate of 81.07%. Table 1 shows the demographic characteristics of the respondents. As seen from the table, academic year-wise participation was highest from I and III year followed by II and IV year, respectively. Majority of them had intermediate levels of computer literacy, average social media use and were beginners with online classes. Table 2 to 14 show the responses of the participants for each domain of the SDL skills. The following paragraph provides the key findings of the study. Majority of the participants were able to identify the learning goals and objectives of the course; had motivation and desire to pursue learning; however reported lack of focus and inconsistency in efforts. Majority of them were able to set the learning goals on their own; however, some reported that they wanted the teacher to tell them exactly what to do. Approximately one third of the participants perceived low self-efficacy in self-regulation and control of learning. Majority of them reported to have problem-solving ability; however, some of them reported that they do not know whom to or how to approach for assistance. Low learning proficiency, similarly, less active participation in discussions was reported in online classes as compared to face-to-face classes. Majority of them reported the ability for assignment work; ability to extract relevant information from library and internet sources; and comprehension competence. Majority of them were able to handle technological tools for learning; however, some of them reported that they avoid study work that needs use of computers. Some weaknesses were perceived in the domain of examination; time management; ability to handle academic stress and procrastination management.

Table 1: Demographic characteristics of the participants

Characteristic (n= 227)		Percentage of Students
Academic year	**I**	**39.2**
	II	24.2
	III	39.2
	IV	19.4
Computer literacy level	Beginner	35.7
	Intermediate	59.5
	Expert	4.8
Social media use	Minimum	13.7
	Average	61.7
	Extensive	24.7
Experience with online courses	Beginner	65.2
	Intermediate	33.9
	Expert	0.9

Table 2: Learning goals

A	Learning Goals	Percentage of Students		
	Identification of goals of learning and course objectives	**Yes**	**To some extent**	**No**
1	Do you know what you want to achieve in terms of learning from the B.P.Th. program?	46.7	49.8	3.5
2	Can you relate the content of the teachings to the course objectives?	66.5	29.5	4
3	Do you plan what you need to learn in a course?	41.9	43.2	15
4	Do you know what you are supposed to be doing whenever you sit down to study?	45.8	44.1	9.7

Table 3: Motivation and desire for learning

B	Motivation and desire for learning	Percentage of students		
1	Do you feel motivated whenever you are studying?	Yes	To some extent	No
		26.4	53.3	20.3
2	Do you persist in your efforts till the learning goals are achieved?	Yes	I am inconsistent	I give up
		33	55.1	11.9
3	Do you feel physically drained when you are studying?	Often	Sometimes	Never
		20.3	74.9	4.8
4	Do you enjoy studying?	Always	Sometimes	Never
		14.5	81.1	4.4

Table 4: Self-responsibility towards learning

C	Self-Responsibility Towards Learning	Percentage of Students		
		Yes	To some extent	No
1	Do you prefer to set your own learning goals?	79.7	15.9	4.3
2	Do you monitor how much you have achieved in terms of learning at each stage of a course?	52	35.7	12.3
3	Do you take the responsibility for your own decisions/actions towards learning?	84.6	12.8	2.6
4	Select a response which is true of you. In a learning situation	Yes		
	I expect the teacher to tell all class members exactly what to do	52.9		
	I can learn things on my own with minimum guidance	47.1		

Table 5: Self-regulation and control of learning

D	Self-Regulation and Control of Learning	Percentage of Students		
		Yes	To some extent	No
1	Do you believe in your abilities and control of your learning?	63	32.6	4.4
2	If there is something you want to learn, can you figure out a way to learn it?	61.2	36.6	2.2
3	Are you methodical and systematic in learning?	38.3	47.2	14.5
4	Are you able to adapt to a new learning situation?	Yes, with ease	Yes, with difficulty	No
		32.6	58.1	9.3

Table 6: Problem-solving ability in learning

E	Problem-Solving Ability in Learning	Percentage of Students		
		Yes	To some extent	No
1	Do you have the ability to focus on and critically evaluate a problem?	42.3	50.7	7
2	Are you aware of your own limitations?	69.6	26.9	3.5
3	Do you enjoy a challenge in learning?	81.9	12.8	5.3
4	**When presented with a problem you cannot resolve, do you ask for assistance?**			
a	Yes	67.8		
b	No, I prefer not to ask	8.4		
c	I don't know whom to/how to approach	25.6		
d	I stay away from the problem	2.9		

Table 7: Seminar/Tutorial Learning Proficiency

F	Seminar/Tutorial Learning Proficiency	Percentage of Students		
	Ability to learn during face-to-face classes	Yes	To some extent	No
1	Do you learn from your teacher and peers during the class?	77.1	20.7	2.2
2	Can you reflect on what you have learnt during class?	51.5	45.4	3.1

Table 8: Online learning proficiency

G	Online Learning Proficiency	Percentage of Students		
	Ability to learn from online synchronous and asynchronous lectures and video lectures (e.g. Zoom, Webex, etc.)	Yes	To some extent	No
1	Do you know how to pick up important information during online presentations?	32.2	56.3	11.5
2	Do you understand what your instructor teaches during online presentations?	37.4	52.9	9.7
3	Can you focus during online presentations?	15.9	51.1	33

Table 9: Discussion proficiency

H	Discussion Proficiency	Percentage of Students		
	Ability to participate in group-based learning activities and discussion forums	Yes	To some extent	No
1	Do you actively take part in discussions in face-to-face classroom activities?	31.3	49.3	19.4
2	Do you actively take part in discussions in online class?	11.5	37.4	51.2
3	Can you follow the content of threaded discussions in online class?	27.3	58.1	14.6

Table 10: Assignment management

J	Assignment Management	Percentage of Students		
	Ability to plan, do and score well in the teacher marked and group-based assignments (e.g., seminars, journal writing, case presentations, etc.)	Yes	To some extent	No
1	Are you able to gather relevant information for your assignments as per the teacher's expectations?	40.5	53.3	6.2
2	Are you able to organize and clearly present the information in the assignment as per the requirement?	49.8	45.5	3.5
3	Do you submit your assignments on time?	Always	Sometimes	Never
		78.4	20.3	1.3

Table 11: Technical proficiency

K	Technical Proficiency	Percentage of Students	
	Ability to handle technical tools for learning	Yes	No
1	Do you feel intimidated whenever you use the internet?	38.3	61.7
2	Do you have problems using computer software and hardware?	42.3	57.7
3	Do you try to avoid study work that needs computers?	52	48
4	Do you understand the data protection and privacy policy of online media?	66.1	33.9

Table 12: Comprehension competence

L	Comprehension Competence	Percentage of Students		
	Ability to understand readings & make study notes	Yes	To some extent	No
1	Do you understand the content of teaching?	74	24.7	1.3
2	Do you know what information to search for assignments/examinations?	58.1	36.6	4.8
3	Do you know how to make notes from your readings?	64.8	29.1	6.1
4	Do you understand what you have written in your own notes taken in seminars or online presentations?	78.9	18.5	2.6

Table 13: Use of sources for studies

M	Use of Sources for Studies	Percentage of Students		
	Finding and evaluating quality sources of information	Yes	To some extent	No
1	Do you know which sources of information to search for in doing your study/assignments?	49.3	41.4	9.3
2	Do you know how to use the library resources?	45.4	44.5	10.1
3	Do you know how to evaluate and extract relevant information from the internet for your assignments?	47.1	43.6	9.3

Table 14: Examination management

M	Examination Management	Percentage of Students		
	Ability to plan, do and score well in examinations	Yes	To some extent	No
1	Are you well prepared for tests and examinations?	13.2	55.1	31.7
2	Are you confident during tests and examinations?	12.3	59	28.6
3	Do you understand what is expected from you when tackling the questions in tests and examinations?	68.3	6.2	25.5
4	Are you able to complete all the questions in tests and examinations?	Almost always	Sometimes	Never
		57.7	7.9	7.5

Table 15: Time management

N	Time Management	Percentage of Students	
	Ability to utilize study time effectively	Yes	No
1	Do you set targets to achieve for assignments and examinations?	73.6	26.4
2	Do you allocate dedicated time blocks for studies?	58.6	41.4
3	Do you consistently follow your study schedule?	20.3	79.7

Table 16: Stress management

O	Stress Management	Percentage of Students		
	Ability to handle academic stress	Yes	To some extent	No
1	Are you able to cope with fear (of not doing well for assignments/assessment) so that you can perform as per your expectation?	23.8	52.4	23.7
2	Even when you don't accomplish your goal and feel demoralized, are you able to focus and work on your goal again?	67	7	26
3	Even if you feel overwhelmed by how much you have to accomplish by the end of the course, are you able to work on it?	41.9	6.1	5.7

Table 17: Procrastination management.

P	Procrastination Management	Percentage of Students		
	Ability to manage procrastination in learning	Often	Sometimes	Never
1	Do you find excuses, give in to distractions and postpone the studies?	33.9	60.3	5.7
2	Do you recognize the urge to gain self-control to prioritize your studies?	Yes	To some extent	No
		65.2	31.3	3.5

Comments from participants revealed some interesting perspectives on their experiences of different types of learning methods in physiotherapy as stated below:

P23

The reason for why we are supposed to learn subjects and certain topics and their actual application in physical therapy should be thought about which also might increase the interest of students!

P44

I would like the teaching to be more practical as in being taught how to relate the things we study for theory to be used practically.

P89

Can we get guidance on how we should focus on the studies and our timetable during the university exams?

P92

If exams must be taken, assignments-based examination will help us a lot, since it will relieve us of the mental stress and anxiety and also motivate us to learn more.

P126

Exams pressure should be lifted for ease learning. Also, this will cause more eagerness to learn new things rather than just mugging up.

P220

Online learning and classes are a bit difficult to understand as compared to classroom teaching!

These qualitative feedbacks further highlight the need for teaching to be more practical; some change in the examination

pattern and need for mentoring to relieve academic stress and time management.

Discussion

Some scholars have recognized the importance of the learning context for SDL (e.g., Candy) [16]. When initial SDL models were developed, face-to-face instruction was the predominant mode in higher education. Almost a decade after the last model was developed (cf., Garrison), [47,48], higher education is occurring in a variety of contexts, ranging from face-to-face classrooms to virtual classrooms. Within each of these settings, a variety of methods may be used to enable interactions, including 100% physical classroom interactions to a blend of face-to-face and online interactions to 100% online interactions. While there are indications that self-directedness is a desirable trait for online learners [48], we do not have an adequate understanding of the impact of a specific learning context (i.e., physical classroom instruction, a web-based course, a computer-based instructional unit) on self-direction. There is a need for new perspectives on how context influences SDL.

We aimed to determine the SDL skills with specific emphasis on the online learning context to indicate the impact of environmental factors on SDL. To summarize, the majority of Physiotherapy students possess the fundamental qualities of SDL skills and year of study did not cause a difference in SDL skills. This is in accordance with previous study findings from a large cohort of undergraduate students which included physiotherapy students [49]. However, students found it difficult to adapt to a new learning situation and expressed a sense of discomfort and insecurity in using online learning platforms. The other domain with low perceived skills was 'self-control' where students mentioned lack of focus, inconsistency in efforts and difficulty to overcome procrastination. It is generally believed that online learning gives more control of the instruction to the learners [50,51]. In fact, some scholars consider SDL critical in distance education settings with its unique characteristic of the physical and social separation of the learner from the instructor or expert as well as other learners [52]. Recent research in an online distance education indicates that students need to have a high level of self-direction to succeed in an online learning environment [48]. In fact, not only does an online learning context influence the amount of control that is given to (or expected of) learners, but it also impacts a learner's perception of his or her level of self-direction. For example, in a recent qualitative case study, Vonderwell & Turner [53] examined pre-service teachers' online learning experience in a technology application course [53]. Participants in the study expressed that the online learning context enhanced their responsibility and initiative towards learning. They reported they had more control of their learning and used resources more effectively.

On the contrary, we observed that students perceived low efficacy in the online learning context. It has been suggested that one of the most significant aspects for a successful informal learning is to enable learners to control their own learning [54]. However, learning through online resources might be demanding for learners because of these self-control, monitoring, and management aspects. Learners might suffer from the effort to reduce disorientation and increase the quality of their learning outcomes [55]. This is the reason why interest and engagement are essential for successful self-directed informal online learning. Autonomous learners should also consider the responsibility for a learning situation [56]. For example, during the learning through online resources, "lost-in-hyperspace phenomenon" often happens, which refers to "experiencing disorientation due to information overload and aimlessly following hyperlinks" [55]. This is the reason why the learners need to control their own learning.

Also, there were a number of extrinsic influences for learning online in a self-directed way. The study findings imply that the online learning/teaching environment requires reconstruction of student and instructor roles, relationships, and practices. Student experiences showed that the online environment influenced their learning. Preparing students for active engagement in learning and collaboration needs to be emphasized in both face-to-face and online environments. As mentioned previously, students' perceptions reflect the learning effectiveness and learning experience in a course. There is only limited research that compares the effect of different educational approaches on self-efficacy in higher education [57,58] In an experimental study on undergraduate physiotherapy students, self-directed learning and traditional instruction-based learning approach showed equal study outcome & self-efficacy at the end of year two [23]. Results of our study indicate that the present curriculum is still not free from teacher-center culture. Student participants of this study had spent years in a learning context that was dominated by a teacher-directed approach to learning and the majority of the students were beginners for the online course. This suggests that they may take a longer time to become efficient users of online learning platforms. It is critical to understand the pedagogical potential of online learning for providing active and dynamic learning opportunities for learners. Students' perceived difficulty in their adaptation to online learning methods highlights the need for prior training with learning platforms, and a change in pedagogical approach.

This exploratory research helped to identify aspects influencing students' learning processes from their own perspectives and provided valuable insights into the special needs and behavior of students in the context of COVID-19 lockdown.

Social Relevance and Implications

The present study considers SDL skills as an important construct for effective implementation of blended learning. The study of SDL online can help identify those trans contextual SDL attributes as well as those unique online-based ones, enabling better online teaching and learning experiences. To develop an online environment further it is important to broaden the understanding of how students perceive online learning and to identify aspects influencing students' learning processes and their adaptation to self-directed learning online and thus to know which aspects need to be reinforced. To enhance the strategies that students can use to improve their self-direction or self-regulation in learning (other than personal discovery, which is usually long

and frustrating), useful strategies can be imparted to them through direct instruction, guided and independent practice, instructor feedback, peer support and pedagogical adaptation. The periodic implementation of the questionnaire developed as a part of this study will help the university undergraduate students enhance and improve academic self-concept, become actively engaged in the learning process, achievable, motivated, and optimistic in their academic life. Institute faculty will be able to apply the questionnaire of self-directed learning in their teaching assessments, which will facilitate their efforts to fulfill the required learning outcomes and enhance academic quality and excellence. Furthermore, self-efficacy in physical therapy practice, or task specific confidence, is considered critical to professional development of the novice PT [59-61] and is considered an independent predictor for student performance in clinical settings [59].

Implications in the short term

This study revealed many of the perceptions held by students that may form barriers to adopting SDL approaches. In the context of COVID-19 lockdown and online learning, this study assisted physiotherapy educators in the diagnosis of student learning needs, in order for the educator to implement teaching strategies that will best suit the students. This will promote an educational climate that will foster adult learning principles, gradually promoting student autonomy and mutual responsibility for learning in a non-threatening environment and, hence, a reduction in student anxiety.

Implications in the long term

Exploring the SDL with a focus on technology readiness can deepen the understanding of blended learning course pedagogy design and can further provide insights into special needs and behaviors of students. Furthermore, this study has provided valuable data for curriculum development. Results of this study can serve to guide educators to optimize and integrate course design and adopt a proper instructional strategy in both online and offline teaching; thus, leading to improved learning outcomes. Integrating these skills and strategies in existing curriculum may potentially enhance the perception of students and can lead to more meaningful learning experience. The need for prior training or briefing of learning platforms; and emphasizing self-directed skills in students can be considered before implementation of blended learning approaches. These perceptions and the students' comments serve to remind us how important it is for us as educators to be explicit in setting goals which incorporate SDL strategies and to provide the framework onto which students gradually graft their own experiences as they become self-directed lifelong learners.

Implications for research

Longitudinal research is needed to determine the long-term outcome which is more relevant for life-long learning. Students' perceptions of SDL to a certain extent reflect the learning effectiveness and learning experience of students in a course. However, these relationships are dynamic in different learning settings and need further exploration. Overall, there is a need for more research on SDL-based on educational context and approaches because these approaches yet lack evidence-based support.

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Conflict of interest

The authors declare that they have no conflict of interests.

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