# Graduate-entry medical students' self-directed learning capabilities in a problem-based curriculum

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## ABSTRACT

**الأهداف:** عرض وجهات نظر طلاب السنة الثالثة وطلاب التخرج بقدراتهم في التعليم الذاتي الموجه في البرنامج الطبي المبتكر للخريجين المشتركين و تحديد الثقة المبنية بوسيلة الاستبيان المستخدمة.

**الطريقة:** تم عمل مخطط استبيان استطلاعي وإعطاء الاستبيان الشخصي لطلاب الطب ما فبل التخرج وعددهم 47 ــ جامعة الملك سعود بن عبدالعزيز للعلوم الصحية ــ الرياض ــ المملكة العربية السعودية في أكتوبر 2008 ومارس 2009 وبعد دخول برنامج التعليم المتكامل عن طريق حل المشاكل (PBL). كما بحث الاستبيان التقدير الشخصي ل 14 قدرة للتعليم الذاتي الموجه SDL.

**النتائج:** كانت الثقة المبنية على الاستبيان عالية ($\alpha$=0.945) وكان للمستجيبين وجهات نظر متوسطة إلى عالية بقدراتهم في التعليم الذاتي الموجه في المناطق التي بين أساسيات البناء الرئيسي للتعليم الذاتي الموجه. مقارنة مع طلاب التخرج، كان لدى طلاب التخرج متوسط عالي ومهم إحصائياً ومقدر على 11 من 14 كفاءة التقدير الشخصي للتعليم الذاتي الموجه SDL $p<0.05$.

**خاتمة:** بشكل مشترك مع دراسات أخرى ل SDL في الخريجين المشتركين بمناهج (PBL)، يرى معظم الطلبة أنفسهم أنهم امتلكوا قدرات متوسطة إلى عالية SDL. احتلت معرفة المتعلمين مستويات لتحديد الاتجاه الشخصي والتي تعتبر مفيدة للطلبة والمتعلمين الطبيين. عن طريق فهم وجهات نظر المتعلمين بقدراتهم على التعليم الذاتي الموجه، نستطيع تصميم تعديل البرنامج الطبي المبني على البراهين الذي يرفع من أهداف المناهج المعدة. نحتاج إلى دراسات متطورة لملاحظة التطبيقات و ثبات القدرات الحسية.

**Objectives:** To explore junior and senior students' perceptions of their self-directed learning (SDL) capabilities in an innovative graduate-entry medical program and to determine the construct reliability of the survey instrument utilized.

**Methods:** A cross-sectional survey design in which a self-report questionnaire was administered to undergraduate medical students (n=43) of King Saud bin Abdul Aziz University for Health Sciences, Riyadh in October 2008 and March 2009; soon after entry and in their year 3 of an integrated problem-based learning (PBL) program. The questionnaire sought self-assessment on 14 SDL capabilities.

**Results:** Questionnaire construct reliability was high (Cronbach's alpha=0.945). Respondents had medium to high perceptions of their self-directed learning capabilities in areas that are among the main building-blocks of self-directed learning. In comparison to junior students, senior students had statistically significantly higher mean scores on 11 of 14 self-assessed SDL competencies ($p<0.05$).

**Conclusions:** Consistent with other studies of SDL in a graduate-entry PBL curriculum, most students perceived themselves as having moderate to high SDL capabilities. Knowledge of learners' perceived levels of self-directedness is helpful for both students and medical educators. By understanding learners' conceptions of their self-directed learning capabilities we can design evidence-based program modifications that are likely to promote intended curriculum objectives. Longitudinal studies are needed observing the application and stability of perceived capabilities.


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Problem-based learning (PBL) is an instructional method that uses real world cases or problems as a starting point for learning and several studies have discussed the positive effects of PBL on various aspects of student learning and performance.[1-4] These include development of self-directed learning skills and enhancement of intrinsic interest in lifelong learning. In a world of rapidly expanding knowledge, promoting in students the capacity to engage in self-directed (SDL) lifelong learning is a goal of medical education. Many graduate-entry courses encourage SDL and students appear to appreciate the flexibility offered.[5] Trying to capture the essence of this multifaceted concept in a single definition is however, very difficult.[6] Knowles[7] originally defined SDL as "a process in which individuals take the initiative with or without the help of others in diagnosing their learning needs, formulating goals, identifying human and material resources, and evaluating learning outcomes". Attempting to bring more clarity to the definition and application of the concept recent authors[8-10] have described self-directed learning as an internalized process related to motivation, self-identity and behaviors that are also dependent on external factors that facilitates a student taking responsibility for their learning. Both internal and external aspects can be viewed on a continuum and optimal learning occurs when the learner's level of self-direction is balanced with the extent to which self-directed learning opportunities are possible.[11-13] Self-directed learning is however, an aspect of learning in innovative curricula that students often express scepticism, and a need for formal support and guidance in application of the process at the beginning of their courses.[14] This desire for instruction, according to Knowles[15] reflects the belief that some adults may be unfamiliar with self-directed learning. By implication, it may also reflect little self-insight into an understanding of their own self-directed learning preparedness or capabilities and there is a paucity of medical education studies in our socio-cultural context in this regard. Indeed, as Miflin[16] suggests, the assumption that students will be self-directed on entry to medical programs has been given little attention in the research literature.

Five medical schools in Saudi Arabia are known to be implementing PBL curricula. As indicated earlier however, successful implementation of PBL calls on conceptions of learning capabilities, attitudes and experience of SDL that students are often assumed to possess on entry to medical school. Furthermore, a review of the literature indicates that little is known about Saudi medical students' conceptions of learning, attitudes and self-concepts as autonomous, self-directed learners or their perceptions of whether the learning environment in medical schools implementing innovative curricula are antagonistic to or supportive of self-directed learning. Student's perceptions of their capabilities are important as both have an effect on their learning.[17] The aim of this study were therefore to explore our junior and senior medical students perceptions of their self-directed learning capabilities in a contemporary graduate-entry program. The author also aimed to determine the psychometric properties of the survey instrument used to determine SDL capabilities. Specific objectives of the study were to determine the extent to which first and third year students at the College of Medicine, King Abdul-Aziz University for Health Sciences perceive themselves as self-directed learners and if there were any statistically significant differences between junior and senior students' self-assessed SDL capabilities.

**Materials.** In November, 2008 first year medical students (Junior students) entering the graduate entry course at King Saud bin Abdul Aziz University for Health Sciences in the academic year 2008-2009 (n=22), were administered a questionnaire aimed at eliciting self-assessment of self-directed learning competencies. In March 2009, the third year class (senior students) (n=21), were administered the same questionnaire.

***Defining self directed learning capabilities.*** For the purpose of this study, self-directed learning competency and therefore readiness is defined as 'the degree to which the individual possess the attitudes, abilities and personality characteristics necessary for self-directed learning'.[19] Important assumptions underlying this definition are that adults are inherently self-directing; SDL capabilities exist along a continuum and are present in all individuals to some extent.

***Self-directed learning self-assessment.*** A review of the literature revealed 2 main instruments available for the assessment of readiness for SDL. Oddi's Continuing Learning Inventory (OCLI)[20] and Guglielminos' Self-Directed Learning Readiness Scale (SDLRS).[21] The SDLRS was initially considered a better instrument since it addresses both attributes and skills and has been used in several disciplines. This 58-item Likert scale aims to measure the degree to which people perceive themselves as having a capacity to engage in self-directed learning. However, although a practical instrument for measuring self-directed learning readiness, studies have indicated that the instrument falls short of measuring characteristics that were determined as associated with self-directed learning. For example, exploring the underlying factor structure of the SDLRS Hoban, Lawson, Mazmanian, Best and Seibel[22] concluded that medical educators should hold limited expectations of the scale for measuring medical students' readiness for self-directed learning. Cognizant of the shortcomings of

the SDLRS and a need to administer a short and easily intelligible instrument in our context, the author chose to utilize a modified version of the self-assessment of self- learning skills scale developed by Heimstra.[13] This 10-item instrument is based on 7 competencies Knowles[7] identified for being a self-directed learner, namely: (i) Understanding the differences between teacher-directed and student-directed learning, (ii) Determining one's concept as a self-directed being, (iii) Relating to peers collaboratively and as resources for learning, (iv) Diagnosing learning needs and formulating objectives, (v) Viewing teachers as facilitators, (vi) Identifying other resources, and (vii) Collecting and validating evidence of accomplishments. The survey was intended to give respondents an opportunity to develop a better understanding of their own levels of self-directed learning competencies and thereby to determine how well they fit these skills as personal attributes. The author adopted this survey as a framework, adding items of interest in our context and modifying the language to ensure students for whom English is a second language would be likely to understand statements. The result was a 14-item survey. A written outline of the purpose of the survey and instructions on its completion were provided. Informed consent was sought and surveys were completed anonymously. Participants were asked to respond to all survey statements indicating their perceived (high, medium, low) self-directed capabilities. A "Don't Know" category was included for those who might have ambivalence/lack of insight regarding their SDL capabilities.

For descriptive and inferential statistical analyses, the SPSS software for Windows Version 16 was used. Means and standard deviations were generated. The independent samples t-test was applied to compare sample means. A 2-tailed p value of <0.05 was considered statistically significant. The Cronbach's alpha was calculated to determine the internal consistency of the questionnaire.

**Results.** Twenty-two of 25 first year students (Junior students, 88% response) and 21 of 22 students third years (senior students) returned completed questionnaires (95% response) (91% response overall). Few responded "Don't Know" (4/47) indicating a high level of self-awareness among respondents. In this study, the internal consistency (Cronbach's alpha) of the total instrument was 0.945. Results regarding perceived SDL capabilities are as follows:

***Medium and high SDL self assessments.*** **Table 1** shows means and standard deviations for the total sample and for groups' regarding perceived SDL

**Table 1 -** First year and third year medical students' self-directed learning capabilities self-ratings.

| Statements | Overall (n=43) | First year (n=22) | Third year (n=21) |
|---|---|---|---|
| 1. A concept of myself as a learner who is not dependent on faculty for directing my learning | 1.49 ± 0.51 | 1.68 ± 0.72 | 2.33* ± 0.66 |
| 2. A concept of myself as a learner who takes personal responsibility for planning and carrying out learning activities | 2.00 ± 0.76 | 1.91 ± 0.81 | 2.57* ± 0.59 |
| 3. An ability to collaborate with peers in seeking and providing help regarding learning activities | 2.23 ± 0.78 | 1.82 ± 0.79 | 2.71* ± 0.46 |
| 4. My ability to realistically diagnose my own learning needs | 2.26 ± 0.80 | 1.86 ± 0.73 | 2.24* ± 0.77 |
| 5. My ability to turn my learning needs into learning goals, plans and activities | 2.05 ± 0.76 | 2.23 ± 0.75 | 2.48* ± 0.51 |
| 6. My ability to relate to teachers as helpers or facilitators and take initiative in making use of their expertise | 2.35 ± 0.65 | 1.82 ± 0.66 | 2.48* ± 0.51 |
| 7. My ability to identify human and material resources appropriate to my different learning needs and goals | 2.14 ± 0.68 | 1.86 ± 0.73 | 2.33* ± 0.73 |
| 8. My ability to select and use strategies for making good use of learning resources | 2.10 ± 0.68 | 1.77 ± 0.53 | 2.48* ± 0.60 |
| 9. My ability to collect evidence regarding my achievement of various kinds of learning objectives | 2.12 ± 0.66 | 1.68 ± 0.84 | 2.24* ± 0.77 |
| 10. My ability to assess my performance through feedback received from others (namely assessment results, feedback from students and facilitators) | 1.95 ± 0.84 | 1.86 ± 0.83 | 2.43* ± 0.81 |
| 11. My ability to observe and model the performance of other respected peers and/or faculty members to improve myself | 2.14 ± 0.86 | 2.18 ± 0.73 | 2.62* ± 0.59 |
| 12. My ability to assess my performance through self reflection | 2.40 ± 0.70 | 2.00 ± 0.87 | 2.43* ± 0.51 |
| 13. My concept of myself as a learner who knows how best I learn (namely I know my learning style/preferences) | 2.21 ± 0.74 | 1.91 ± 0.87 | 2.52* ± 0.51 |
| 14. My preference to take part in deciding what I will learn and how | 2.21 ± 0.77 | 2.00 ± 0.71 | 2.62* ± 0.50 |

Data are expressed as mean ± SD. *$p \leq 0.05$. Scoring: 0= don't know; 1 = low; 2 = medium; 3 = high.

capabilities. Overall ratings indicate that our students have moderate self-perceptions of their capabilities as self-directed learners. This was particularly the case for junior students (first year). However, on comparing group means, senior students (third year) tended to rate themselves as having higher self-conceptions of their capabilities on 11 of the 14 indicators of SDL readiness and the analysis showed statistically significant differences between the groups regarding a concept of self as a learner who is not dependent on faculty for directing my learning ($p$=0.003); a concept of self as a learner who takes personal responsibility for planning and carrying out learning activities ($p$=0.004); ability to collaborate with peers in seeking and providing help regarding learning activities ($p$=0.000); ability to relate to teachers as helpers or facilitators and take initiative in making use of their expertise ($p$=0.001); ability to identify human and material resources appropriate to different learning needs and goals ($p$=0.040); ability to select and use strategies for making good use of learning resources ($p$=0.000); ability to collect evidence regarding own achievement of learning objectives ($p$=0.029); ability to assess performance through feedback received from others (namely assessment results, feedback from students and facilitators) ($p$=0.030); ability to observe and model the performance of other respected peers and/or faculty members to improve self ($p$=0.037); self concept as a learner who knows how best I learn ($p$=0.007) and preference to take part in deciding what and how I learn ($p$=0.002). No statistically significant group differences were found regarding ability to realistically diagnose own learning needs, to turn learning needs into learning goals, plans and activities and to assess performance through self reflection.

**Discussion.** This study provides a glimpse into junior and senior medical students' perceptions of their self-directed learning competencies. It comprises part of an on-going evaluation process within the College of Medicine to improve and assure quality teaching and learning. To the best of the researcher's knowledge, this is the first exploration of self-directed learning readiness in a PBL course in a Saudi population. The hope is that the paper stimulates discussion about how to maximize the self-directed learning capabilities of students at different stages of PBL curricula and in different socio-cultural contexts. Findings of the study indicate that our graduate-entry medical students are no different from those in other socio-cultural contexts; as they perceive themselves as possessing moderate to high self-directed learning capabilities on entry to and at a later stage of a PBL curriculum respectively. They appear to have the main goal setting and self-management competencies that are the basic building blocks of self-directed learning.[23] The study reported here also indicated that senior students had stronger conceptions of themselves as self directed learners; knowledgeable on how best they learn and perceive themselves as individuals with a preference for deciding on what and how they learn-skills, which will be highly relevant in the internship and throughout their professional careers. Self-directed learning is a multifaceted process and strategies evolve over time. Metacognitive and reflective strategies can develop gradually with guidance. Anecdotal and research evidence have suggested ability to apply metacognitive strategies including self-evaluation and reflection are influenced by epistemological beliefs,[24] which in turn may be influenced by socio-cultural background. Using a reflective journal assignment with clinical physiotherapy students in the United Arab Emirates however, Larin et al[25] found students' ability to reflect on how they learn in clinical placements compared positively with those of Canadian students. Case studies conducted by Evensen et al[26] also suggest that learner reflection about SDL leads to increasing tendency to modify or invent better SDL strategies. However, most groups need help to reflect on their learning.[27] Overall findings thus indicate a diversity of SDL capabilities and experience of skills on entry to and during later stages of medical school, which are consistent with similar studies of graduate-entry students' self-directed learning.[10] From their experiences of graduate entry students' self direction, Miflin et al[10] found that students became "more rather than better, self directed learners as a result of growing confidence in the [PBL] tutorial process" and suggests that this is perhaps a more accurate reflection of how mature students develop in a PBL curriculum, supporting the argument endorsed here, that mature students are self-reliant and capable of self-direction when they enter a course, but need guidance as to the direction they should take at the beginning of new experiences. Indeed, most authors acknowledge that SDL is a developmental process and competencies evolve over time,[23,28] supporting the belief that "self-directed learning is more in tune with our natural processes of psychological development"[15] and is an orientation developed through socialization. Self-directed learning theory building in a framework of sociological, psychological and pedagogical dimensions is therefore vital.[30]

Nonetheless, developing SDL capabilities currently perceived as low to moderate by junior students in our context will require a number of supportive strategies including encouraging students to generate learning contracts with advising faculty/personal tutors. Learning contracts are an important tool for successful and positive self-directed study experiences for both students and advising faculty members.[31,32] In negotiating a learning contract for goals, strategies, and evaluation criteria,

faculty can therefore help create a sense of partnership with learners and facilitate a needs assessment approach to discovery of what objectives should be set and what resources match identified learning needs. In this way, junior students' development of a sense of control in SDL could be enhanced. The PBL facilitators' roles in promoting students' motivation for learning and acting as a metacognitive coach are also essential support mechanisms.[33] Encouraging faculty to see themselves as partners in the educational process and to provide guidance and support to students both outside PBL sessions, and [to a lesser extent] within the PBL process are additional important aspects for faculty development programs. Other researchers have observed misinterpretations regarding the amount of guidance to provide for students in courses that emphasize SDL, which has resulted in a minimalist "hands off" approach being adopted.[12] As with any new curriculum, formal orientation and development will also be required of faculty members to ensure that they fully understand their roles and responsibilities and are able to articulate the rationale for and defend SDL to skeptical students. Many universities, like our own, now have medical education departments which assist faculty in gaining a sound understanding of modern educational theories and strategies like PBL and should be utilized for the purpose of articulating the multifaceted nature of SDL throughout the academic year. Interestingly, there were no statistically significant mean differences between groups regarding perceived abilities to realistically diagnose own learning needs, to turn learning needs into learning goals, plans and activities and to assess performance through self reflection. This could be an indication of effectiveness of the College's encouragement of critical self-evaluation and a move beyond students' sole reliance on external expert assessment of their performance. The lack of group differences in these areas may thus be an indication that most students perceive they are developing confidence and competence in evaluating whether their learning theories and actions are effective. Another interesting finding was that approximately a third of junior students rated themselves low on knowledge of how best they learn. Understanding how one prefers to learn can be examined through a learning style inventory. In our series, this finding was surprising given recent efforts to include administration of a learning style inventory in the student orientation program. There is a number of learning style or learning preference inventories available in the literature. Among those commonly cited are the Kolb[34] and Honey and Mumford[35] inventories. Both have congruence with concepts fundamental to SDL such as experiential learning, reflection and experimentation.

Finally, the study involved 'self assessment' of SDL capabilities and one might legitimately question whether self-assessments are a true reflection of self-directed learning capabilities. Various authors have questioned the ability of students and physicians to accurately self-assess their capabilities, performance and learning needs.[36,37] A recommendation is that self-assessment should be used as one tool amongst other sources to provide a more complete appraisal of competencies.[36] The author supports this recommendation as well as the sentiments of Hoban et al[22] that there should be a reorientation of self-directed learning in a direction away from measures of perceptions towards observation of self-directed learning endeavors and a future qualitative study is planned to achieve this objective in our context.

Findings of this study should be interpreted cautiously since this was an exploratory study. They may however provide a baseline on which to consider the preparedness of graduate-entry medical students for SDL in similar contexts. Furthermore, the junior students were approximately one month into the PBL curriculum before data collection took place. Due to time-tabling constraints at the beginning of the academic year, it was not possible to administer the questionnaires any earlier. It is therefore possible that early, albeit short, PBL experiences before questionnaire administration to this group may have positively influenced self-assessments of SDL capabilities.

In conclusion, the speed of information proliferation and the complexities of medical education in the twenty-first century make development of self-directed learning capabilities of medical students imperative. These capabilities exist to some degree in all adults but need support, encouragement, and conducive learning environments in which to develop. The author concludes that our graduate-entry students are no different from the students in other socio-cultural contexts in terms of their readiness for SDL and their development of relevant capabilities. They perceive themselves to possess basic characteristics necessary to engage in SDL at commencement, and as they near the end of the undergraduate medical course. These capabilities should be fostered by all aspects of the undergraduate and postgraduate learning environments. Support mechanisms are however, important for both faculty and students to assist development of a clearer understanding of the multifaceted nature of, goals and processes of SDL. Knowledge of learners' perceived self-directedness is helpful for both students and medical educators. Only by understanding students' beliefs on their self-directed learning skills can we facilitate design of evidence-based interventions that are likely to promote undergraduate and postgraduate program objectives. Longitudinal research with these and other

groups will however be necessary to further validate the results obtained and to determine the extent to which self-perceived capabilities change when students progress into postgraduate medical education.

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