

The Effectiveness Of Self-Directed Learning On The Professional Development Of Pre-Registration Nursing Students: A Systematic Review Of The Literature

فعالية التعلم الموجه ذاتيا على التطوير المهني لطلبة التمريض ما قبل التسجيل
مراجعة منهجية للأدبيات

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الخلاصة:

خلفية الموضوع: طبيعة مهنة التمريض تتطلب كواحد تمريضه ذات كفاءة وثقة وعلى قدر عال من المسؤولية وقادرة على العمل بشكل مستقل و الاستجابة في البيئة الصحية المتغيرة (جاريسون 1992). وبالتالي ، انتقل الاتجاه في تعليم التمريض نحو نهج الكبار في التدريس والذي يعتمد على التعليم الموجه ذاتيا للطلاب حتى تمكنهم من مواجهة التحديات الجديدة . التعلم الذاتي هو واحد من البرامج التي أنشئت على أساس نهج تدريس الكبار . التعلم الذاتي ليس فقط وسيلة للتعلم الفعال لاكتساب المعرفة وصل المهارات ولكنها أيضا تعتبر بمثابة وسيلة لتمكين طلاب التمريض لاكتساب وتطوير مهارات التعلم المستقل ، وكذلك تنمية الشعور بالمسؤولية التي سيحتاجها الطلاب في حياتهم المهنية المستقبل .

الهدف: ويتمثل الهدف العام من هذا الاستعراض هو تقييم فعالية التعلم الذاتي الموجه على التطوير المهني لطلاب التمريض ما قبل التسجيل.

منهجية: وقد أجريت مراجعة منهجية للأبحاث المنشورة عن التعلم الذاتي وقد تم البحث عن الدراسات المنشورة وغير المنشورة بين عامي 1985 و 2009 باستخدام كافة قواعد البيانات الإلكترونية الرئيسية. فقد تم استخدام أربع استراتيجيات لعملية البحث التي تألفت من: استخدام المصطلحات والكلمات الرئيسية المختلفة لضمان استعراض جميع الأبحاث ذات الصلة بالموضوع . لبحث الدقيق خصص للحصول على الدراسات التي استخدمت الطرق التجريبية العشوائية وشبه التجريبية التي قارنت بين التعليم الذاتي والتعليم بالطريقة التقليدية في التدريس والتي نشرت بين عامي 1985 و 2009 . واعتبرت سنة 1985 مناسبة لأن التعليم الذاتي وجد انه استخدم في تعليم التمريض في أوائل 1980 (ق) و 1990 (ق) في بعض البلدان . وشمل الاستعراض على الدراسات التي تناولت طلاب التمريض التسجيل المسبق . ركز الاستعراض على الدراسات التي تناولت نهج التعليم الذاتي ومقارنته بالطريقة التقليدية في التدريس. تم استخدام عدد طرق لتقييم فعالية التجارب التي استخدمت في الأبحاث والتي اشتملت على تحسين المعرفة واكتساب المهارات الحركية، وإضا رضا الطلاب بالتعليم الذاتي ومهارات حل المشاكل . ولتقييم جوده الدراسات التي استخدمت في هذا الاستعراض لقد تم قد الاعتماد على نموذج معهد جونا برديج للتقيم . بعد التقييم لقد تم اختيار مجموعه ثمانية ورقات تنطبق على الاستعراض على أساس المعلومات المقدمة في العنوان والملخص . ثم معالجة هذه الدراسات إلى عملية تقييم نقدي من قبل اثنين من المراجعين المستقلين لتقييم الجودة المنهجية للأوراق. بعد التقييم النقدي ، أدرجت سبع ورقات من اصل ثمانية. ستة منها اعتمدت على البحث التجريبي العشوائي في الدراسات وواحدة استخدمت البحث التجريبي شبه عشوائي. تم استخراج البيانات باستخدام أداة استخراج البيانات المعدلة بمعهد جونا برديج . وكانت البيانات المستخرجة قابلت من قبل الفاحص آخر . طبيعة غير متجانسة من الدراسات المشمولة منعت التحليل التلوي ، وبالتالي، قدمت النتائج في هذا العرض بملخص سردي . وقد جمعت نتائج الدراسات ' حسب المواضيع التي استنتجت من نتائج تلك الدراسات.

النتائج: وصلت معظم الدراسات إلى استنتاج أن التعليم الذاتي هو نهج فعال للتعلم في برامج التمريض ولكن ليس أكثر من الطريقة التقليدية في التدريس. وطقد وجد ان التدريس طريقه التدريس الذاتي يسهل اكتساب المهارات والمعارف و مهارات حل المشكلة على نحو فعال . أيضا ، هو نهج مرضي ويلي احتياجات الطلاب.

التوصيات: طبيعة مهنة التمريض تشير إلى أن التمريض هو أبعد من مستوى المعرفة واكتساب المهارات . فإنه يتطلب مزيجا من القدرات المختلفة والتي تشمل الثقة والمسؤولية واتخاذ القرار و التعلم مدى الحياة لذلك لا يقتصر فقط على المهارات والمعارف . ولذلك، يجب أن تكون برامج التمريض منسجمة مع التغييرات فاعالم وان تلبى مطالب المتعلمين الكبار، وفعالية هذه الطريقة التعليمية فإنه ينصح لمدارس التمريض التي لا تزال تتضمن الطريقة التقليدية في التدريس بان تفكر في إدخال برامج التعليم الذاتي لمساهمتها ونتائج المثمرة على المدى الطويل.

الكلمات الدالة: التعلم الذاتي ، التعليم الذاتي ، طلبة التمريض والتدريس التقليدية ، نهج تعليم الكبار

Abstract:

Background: The nature of the nursing profession requires professionals who are confident, responsible, motivated and able to work and respond independently in a changing health care environment (Garrison 1992)⁵. Hence, the trend in nursing education has moved towards an adult approach to teaching in which students must be self-directed to be able to meet the new challenges. Self directed learning (SDL) approach is one of the programmes which has been established based on adult teaching approach. SDL does not only provide a means for effective learning of knowledge and skills but also serves as a vehicle for enabling nursing students to acquire and develop independent learning skills; as well as develop a sense of accountability and responsibility that equips them with the essential attributes they require for their future nursing career.

Aim: The overall aim of this review is to evaluate the effectiveness of self directed learning on the professional development of pre-registration nursing students.

Methodology: Systematic review of the literature was conducted. A search for published and unpublished studies between 1985 and 2009 was done using all major electronic databases. A four step search strategy was devised which consisted of using different terminology and keywords to ensure that all material relevant to the review was captured. The review included randomised controlled trial and quasi-experimental studies that compared between SDL and the traditional method of teaching published between 1985 and 2009. The year 1985

was deemed appropriate because SDL has been utilised in nursing education in early 1980(s) and 1990(s) in some countries. The review included studies that addressed pre-registration nursing students. The review focused on studies that addressed SDL approach as an intervention and compared it to traditional method of teaching. Nevertheless, some Canadian studies addressed traditional method of teaching as an intervention and compared it to SDL as the predominant approach in Canada is SDL and students' were dissatisfied with this approach. Therefore, these studies were also considered as it is still compare between SDL and traditional method of teaching. A variety of outcomes measures was used to evaluate the effectiveness of SDL. These include, improvement in knowledge, psychomotor skills acquisition, students' satisfaction with SDL and problem solving skills. A total of eight papers were considered applicable to the review based on the information provided in the title and the abstract. These studies then processed to the critical appraisal process. Two independent reviewers assessed the methodological quality of the retrieved papers using Joanna Briggs Institute (JBI) checklist for experimental studies and agreed for the papers for inclusion. After critical appraisal, a total of seven papers were included in this review of which six are RCTs and one is quasi-experimental design. Data were extracted using a modified data extraction instrument of JBI. The data extracted were crosschecked by another examiner. The heterogeneous nature of the included studies prevented meta-analysis; therefore, the results of these studies presented in a narrative summary. The studies' results were grouped by themes that were pulled out from the outcomes of those studies.

Results: Most of the studies reached to a conclusion that SDL is an effective approach for learning but not more than the traditional method of teaching. SDL found to facilitate the acquisition of skills, knowledge and problem solving skills effectively. Also, it is a satisfying approach and meets students' needs.

Recommendation: The nature of nursing profession indicates that, nursing is beyond the level of knowledge and skills acquisition. It requires a mixture of different capabilities which include the confidence, responsibility, decision making and life long learning so it is not just limited to skills and knowledge. Therefore, since nursing programs must be congruent with today's world changes and meet the demands of adult learners, nursing schools which still incorporate traditional method of teaching, should think of introducing SDL programs for long term outcomes.

Key words: Self directed learning, SDL, Nursing students, traditional teaching, adult learning approach

INTRODUCTION

The challenge in nursing education lies in the production of a nursing workforce. This requires nurturing the students with the necessary competencies that will facilitate their transition from nursing students to qualified staff nurses (Quinn and Hughes 2007). However, despite the unlimited efforts utilised by nurse educators in nursing education, a theory and practice gap still exists and nursing students still lack the necessary competencies which are required for their future career (Landers 2000).

Many factors have been suggested in the nursing literature which may form an obstacle for effective teaching and learning and which consequently may impede the transfer of knowledge from theory to practice. One of these factors is inappropriate educational approaches that are utilised for teaching nursing students (Leonard 1993, Andrews 2008).

The traditional method of teaching has predominated in nursing education; however, it has been criticised for being an unsatisfactory approach with which to teach adult learners. This is especially so in this era in which the trend in nursing education has moved towards an adult teaching approach (Andragogy) and has proven to be an effective approach that may replace pedagogy (O'Shea 2003).

BACKGROUND

Adult learning theory (Andragogy); the art and science of helping adults learn, was first introduced by Malcolm Knowles (1975) who discovered, through his work with adults, that educators must care for adult learners' actual learning needs instead of focusing on what educators want them to learn. Knowles (1984) has suggested four postulates, which represent how adults learn (see figure 1).

Many programmes have been established in nursing education based on Knowles theory. Self Directed Learning (SDL) is one of these programmes and has been recommended widely in the literature for its effectiveness.

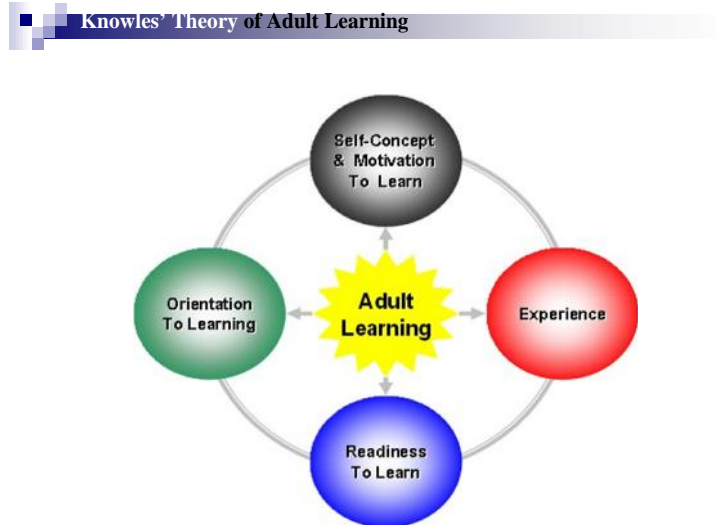


Figure 1: illustrates knowles' theory of adult learning.
[http://leanlearning.wikispaces.com/instructional design#knowles postulates](http://leanlearning.wikispaces.com/instructional+design#knowles+postulates)

Different terms have been identified in the literature to define SDL; for example, students' centred learning, autonomous learning, student directed learning, self-managed learning, lifelong learning and independent learning (Regan 2003). However, the term SDL has been mainly used in the literature and has been defined as a style of learning, in which students use their initiative and take responsibility for learning with or without teachers' facilitation (Slevin and Lavery 1991). The aim of this approach is to help the learners to depend on themselves to seek out the information required in order to achieve their objectives (Wilson 1993). SDL can take multiple forms which include independent reading, informal discussions, independent study, self-directed packages, guided study, group work, role-play, learning contracts, computer-assisted learning, distance education and teleconferencing (Stone-Griffith 1992).

Literature review

SDL has been encouraged recently in nursing education because it facilitates the professional development of nursing students in terms of improving knowledge, psychomotor skills, and overall attitudes of the students. SDL not only provides a means for effective learning of knowledge and skills, but also serves as a vehicle for enabling nursing students to acquire and develop independent learning skills, as well as develop a sense of accountability and responsibility that equips them with the essential attributes they require for their future nursing career (Slevin and Lavery 1991). It has been suggested that those nursing programmes that have incorporated SDL provide a higher degree of confidence, autonomy on the student nurses and encourage students' self-assertiveness (Majumdar 1998, Wilson 1993).

Also, SDL allows for individual learning styles, self pacing and self initiative for learning. It has been suggested that, students on SDL programmes learn more deeply, better and longer (Jones 2005). Therefore, it facilitates the preparation of life long learners who are able to work independently in a changing and challenging health care environment (Garrison 1992).

Furthermore, the nature of the activities in SDL assists the students to develop skills of inquiry or healthy scepticism, which was identified by Dewey (1982) as the essence of critical thinking. Therefore, through SDL, students' decision-making, critical judgment and critical

thinking skills are enhanced; this in turn, facilitates the transfer of study skills from one situation to another (Race 1990).

In addition, it has been suggested that, SDL activities encourage students' motivation towards learning because students are given the chance to seek, analyse and utilize information independently (Schmidt 2000). This, in turn, improves students' sense of accomplishment and satisfaction (Levett-Jones 2005, Sparling 2001, Prociuk 1990) which are important features that adult learners seek in any education programme.

JUSTIFICATION FOR CONDUCTING SYSTEMATIC REVIEW ON SDL

It has been clearly recommended in the reviewed literature (Montgomery 2009, Silen and Uhlin 2008, Levett-Jones 2005, O'Shea 2003, Regan 2003, Lunyk-Child 2001, Hewitt-Taylor 2001, Schmidt 2000, Pedley 1997, Majumdar 1996, Wilson 1993, Slevin and Lavery 1991, Harvey and Vaughan 1990, Wickenden 1989) that, the trend in nursing education has moved towards adult approaches to teaching in which students must be self directed and play a central role in the learning process. Therefore, it is important for nursing schools which still incorporate didactic teaching to re-investigate the traditional curriculum for the long terms effects for the students.

Pre-registration nursing programmes in Oman still utilise a traditional way of teaching. The nursing curricula in all undergraduate nursing institutes are structured in a pedagogical way in which nurse educators are predominant in the learning process and nursing students have learned to be passive and dependent on nurse educators for learning. Therefore, nursing students grow up in a passive environment and their rights as adult learners tend to be lost in this traditional curriculum.

Since the transition in nursing education is to incorporate approaches which must meet the demands of adult learners and satisfy their needs, it is then important to consider an alternative, effective method to replace the pedagogical nursing curriculum in pre-registration nursing programmes in Oman. SDL has been recommended widely in the literature which may aid nursing students' professional development in terms of skills, knowledge, confidence, responsibility, autonomy and life long learning. However, the notion to include SDL in the pre-registration nursing programme has remained debatable (Levett-Jones 2005, O'Shea 2003) due to the belief that students who are conditioned by the pedagogical method of teaching in their compulsory schooling may not be able to be self-directed in learning in the early years in nursing education (Levett-Jones 2005). This suggests the need to examine carefully the evidence which has dealt with this approach, before implementing it within the pre-registration nursing curriculum in Oman.

Therefore, the aim of this review is to evaluate the effectiveness of a self-directed learning approach on the professional development of nursing students in pre-registration nursing programmes, through systematic review of the literature. More specifically, the objectives to be addressed in this review are:

- To identify the outcomes of SDL on the students' professional development.
- To compare the pedagogical method of teaching and SDL in terms of their effects on the professional development of nursing students.
- To identify whether combining SDL method with other teaching methods will produce better outcomes.

REVIEW METHOD

Inclusion criteria

The review included randomised controlled trials and quasi-experimental studies that compared SDL with the traditional method of teaching in pre-registration nursing programmes. These studies were published between 1985 and 2009 as SDL has been utilised in nursing education in early 1980(s) and 1990(s) in some countries. Studies which were conducted in any other field than nursing were excluded. Studies which were conducted before 1985 were also excluded.

Types of participants

This component of the review considered all studies that included pre-registration nursing students.

Types of interventions and outcomes measures

The review included randomised controlled trials and quasi-experimental studies that compared SDL with the traditional method of teaching in pre-registration nursing programmes. A variety of outcome measures was considered to evaluate SDL effectiveness. These include knowledge and psychomotor skills acquisition, students' satisfaction and problem solving skills.

SEARCH STRATEGY OF THE ARTICLES

A search for published and unpublished studies between 1985 and 2009 was conducted using all major electronic databases.

The search strategy was designed to retrieve both published and unpublished studies. Published articles were searched from different databases which are: CINAHL, MEDLINE, EMBASE, ASSIA, SCOPUS, Zetoc, PsycINFO, British Nursing Index, Expanded Academic ASAP, PubMed, AMED, All EMB review (including Cochrane Library, DSR, CCTR, DAR, ACP Journal Club, CMR, HTA and NHSEED).

Unpublished studies were searched from the following databases:

SIGLE, Digital dissertation, Research and clinical trial registers, Dissertation Abstracts International

A four step search strategy was devised which consisted of using different terminology and keywords to ensure that all material relevant to the review was captured.

First, an initial limited search of Ovid MEDLINE, Ovid CINAHL databases was undertaken to identify keywords contained in the title or abstract, and of the index terms used to describe the article. Once different key terms were identified, a comprehensive systematic search strategy was carried out.

Second, a comprehensive search of Ovid Medline, CINAHL, PubMed, British Nursing Index, EMBASE, PsychInfo, ASSIA, SCOPUS, ASAP, AMED, Zetoc and All EMB review (including Cochrane Library, DSR, CCTR, DAR, ACP Journal Club, CMR, HTA and NHSEED) was established using general key words that represent the topic dissertation.

The third stage included a combined search strategy in which all types of interventions, the outcomes, the population and the research designs were included in the search. This process could only be done on some databases like Medline, CINAHL, PubMed, EMBASE, EMB review and EMBASE Classic & Emabse. British Nursing Index and PsychInfo databases were also searched; however, no articles were found after combining process.

The last step of the search was, checking the retrieved articles' references for any new articles which met the inclusion and exclusion criteria. However, no new article was found during this process.

From the initial search, a total of 201 articles were retrieved (See table 1). All duplicates have been removed which resulted in a total of 52 articles. Those articles were then assessed for the relevance of the review based on the information provided in the title, abstract and descriptor terms. Following the first filter, 16 articles were retrieved. Those articles were then assessed against the inclusion and exclusion criteria. After this assessing process, the number of articles, which were found to meet the inclusion and exclusion criteria, was 6. Therefore, in total, 6 articles were considered appropriate for the review, of which one article was found to be a pilot study (LeFlore and Anderson 2007). The full study was retrieved after contacting the original author by an email.

In the second combined search, a total of 25 articles were found (See table 4). Those articles were assessed for the relevance of the review based on the information provided in the title and the abstract. Once all duplicates had been removed, a total number of ten articles were retrieved. Those articles were then assessed against the inclusion and exclusion criteria. In total, 5 articles were considered appropriate for the review.

Table 1: The total number of articles retrieved from the initial search

Database	Results (from all keywords)	Number of articles retrieved
CINAHL	259	20
Medline via Ovid	94	36
PubMed	705	33
EMBASE via Ovid	144	14
PsychInfo via Ovid	72	14
British Nursing Index & achieve	63	6
ASSIA in nursing (via Metalib)	21	6
SCOPUS	691	41
Zetoc in nursing (via Metalib)	99	8
Expand Academic (ASAP)	208	4
AMED via Ovid	153	1
EMBASE Classic & Embase	154	13
All EMB review via Ovid	36	5
Total		201

Table 2: The total number of articles retrieved from the combined search

Database	The results
CINAHL	5
Medline via Ovid	5
PubMed	12
All EMB review via Ovid	1
EMBASE via Ovid	1
EMBASE Classic & Embase via Ovid	1
Total	25

The total number of articles which were found to meet the inclusion and exclusion criteria from the first and second search were eleven. All duplicates were removed which resulted at the end in a total of eight articles. Those eight articles were then processed for the critical appraisal process. Figure 1 will illustrate the search and the filtering process of the retrieved articles.

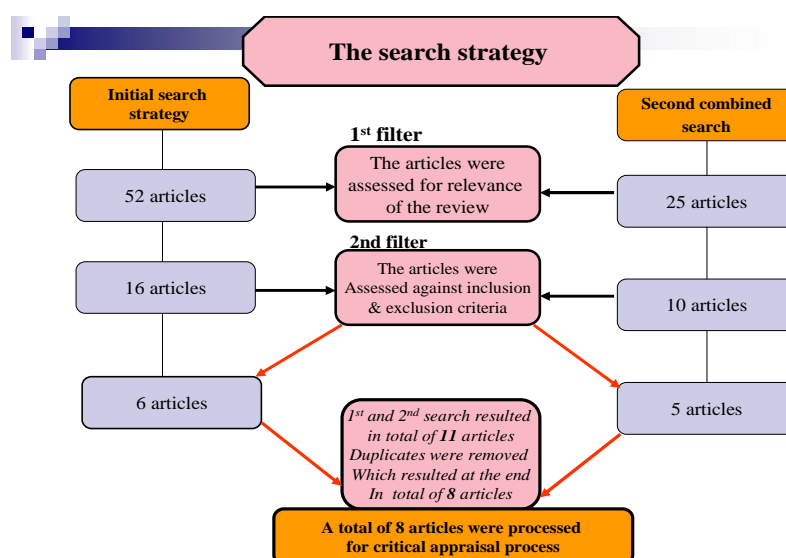


Figure (1) illustrates the initial & second search strategy and the total number of articles retrieved from both searches.

Critical appraisal

The methodological quality of those papers was assessed by two independent reviewers using Joanna Briggs Institute (JBI) checklist. The JBI checklist was found to incorporate all the essential elements that were suggested in the literature, which must be present in any experimental design.

The JBI checklist tool contains 11 items and each study was assessed against those items by identifying that the studies have met the criteria on the checklist. In this review, disagreement did not occur and consultation was not needed regarding the critical appraisal. However, a disagreement occurred regarding one article which was conducted as a second phase study of a previously conducted RCT. The first reviewer considered this study as an independent study; however, the second reviewer considered it as one study. Therefore, a third, experienced and expert reviewer was consulted and suggested it should be considered as

an independent study. Contacting the authors for clarification was not needed in this review; however, one author (LeFlore et al. 2007) was contacted by an email for the purpose of retrieving the full study as, in the search, only a pilot study was found.

However, it was expected that there would be variations in the level of validity of the evidences. Therefore, in order for the studies to be treated equally and given similar weight, the decision was made to identify key and essential elements that all studies must have demonstrated. It was decided that the studies, which would be considered to have met the criteria for the methodological quality, must demonstrate the following criteria from the checklist. First, all studies must demonstrate that the groups were comparable at entry. This is because, if the characteristics of the two groups were not similar at the baseline entry, the results would be affected by the variations presented in the groups (Crombie 1996). Second, the groups had received the same treatment other than the intervention provided. If one group received extra attention and care by the researcher, the results would most likely be affected. Third, the outcome measures were measured in the same way for all study participants as any difference in the way of measurement would affect the results (Bryman 2008). These criteria are deemed important because, weighing up the risks of bias in the identified checklist suggests that, these three elements may lead to drastic changes in the findings (Punch 2009) if they are not demonstrated, as has been highlighted in the literature (Jadad and Enkin 2007, Gerrish and Lacey 2006, Sauerland and Seiler 2005, Egger et al. 2001).

In addition to the three identified criteria, the decision was also made to award the evidence scores to ensure that the evidence is given equal weight for inclusion. Therefore, each element was awarded one point. Nevertheless, considering the afore-mentioned elements (blindness, follow up, randomisation, and concealment), which may not be applicable, it was decided that studies must score ($\frac{5}{11}$) or above in order to be included.

From eight papers, one paper was found to be of a low quality; therefore, it was excluded from the review. After appraisal, seven papers were included in this review.

Data Extraction

The seven studies that met the criteria for the methodological quality after the critical appraisal were then processed to data extraction. Data extracted from the papers using a standardised data extraction tool from JBI for experimental studies. However, this tool was slightly modified in order to fit for extracting the statistical data from the selected evidence.

Data synthesis

In this review, it was impossible to represent the data in statistical Meta-analysis as the results did not lend themselves to be pulled in this manner due to results' heterogeneity. Therefore, the findings are presented in a narrative form. The studies' results were grouped by themes that were pulled out from the outcomes of those studies.

RESULTS

A total of seven articles were included in the review. Six of these studies are RCTs (Gega et al. 2007, Jeffries et al. 2003, Majumdar et al. 1998, Nixon et al. 1996, McAdams et al. 1989 and Love et al. 1989) and one study is a quasi-experimental design (Parfitt 1989).

The study results are grouped by themes that are pulled out from the outcomes of the seven studies. Studies are compared in terms of the intervention utilised and the outcome measures obtained.

Knowledge improvement

The theme, knowledge, is the most common theme addressed in most of the seven papers in this review. Five of the studies (Gega et al. 2007, Jeffries et al. 2003, Majumdar et al. 1998, Nixon et al. 1996 and Parfitt 1989) intended to find out the level of knowledge gained by the students from the two teaching methods (SDL and the traditional way of teaching).

Four studies (Majumadar et al. 1998, Jeffries et al. 2003 and Gega et al. 2006 and Parfitt 1989) reported no significant difference found between the experimental and the control group in terms of knowledge gained by using different interventions.

Majumadar et al. (1998) conducted RCT design to compare knowledge acquisition from practising nursing procedures between two groups. The experimental group was exposed to Demonstration and Return-Demonstration (DRD) skills. Level of knowledge in this study was assessed by OSCE. The results of this study revealed that there was a slight difference, but not significant ($P=0.05$), found between the two groups in some stations

Parfitt (1989) reached similar findings by conducting a quasi-experimental design. The experimental groups in this study were assigned to SDL package and compared to the control group who was exposed to traditional way of teaching. Acquisition of knowledge in this study was assessed by pre and post Multiple Choice Questions tests (MCQ). The findings of this study revealed that there was no significant difference noted between both groups in terms of knowledge acquisition in pre and post MCQ tests.

Jeffries et al. (2003) and Gega et al. (2007) utilised (RCT) design and compared the experimental group which was exposed to computer based SDL to the control group which was taught by a lecturing method.

The level of knowledge gained was assessed by pre and post (MCQ) test. Both studies revealed that, there was a significant difference ($P<0.001$) noted between pre and post tests scores for both groups but no significant difference noted between both groups in terms of knowledge acquisition.

Only one study reported an improvement in the level of knowledge gained by SDL method than traditional method of teaching (Nixon et al. 1996).

PSYCHOMOTOR SKILLS ACQUISITION

Six studies (Jeffries et al. 2003, Majumdar et al. 1998, Nixon et al. 1996, and Love et al. 1989, McAdams 1989, Parfitt 1989), intended to examine the effect of SDL on the students' acquisition of psychomotor skills.

Four RCT studies (Jeffries et al. 2003, Majumdar et al. 1998, Love et al. 1989, McAdams 1989) reported no statistical significant difference found between SDL group and the group taught by teacher centred method in the acquisition of psychomotor skills.

Love et al. (1989) and Majumdar et al. (1998) using RCT design and measured psychomotor skill acquisition by two exams of OSCE. The results of both studies revealed that, there was a significant difference noted between the scores obtained in OSCE₁ and OSCE₂ for both groups ($P<0.05$). Both groups improved in psychomotor skills acquisition in OSCE₂. However, the overall scores between both groups showed no significant difference noted in the level of learning psychomotor skills.

Interestingly, Jeffries et al. (2003) reached similar findings to Love et al. (1989) and McAdams (1989) and Majumdar et al. (1998); despite using a different intervention which is computer based SDL. The acquisition of psychomotor skill was measured by the observation method of the students performing the skill. The findings revealed that there was no significant difference noted between the groups.

McAdams (1989) conducted the 2nd phase experiment of (Love et al. 1989). A questionnaire was distributed about their preferred method of learning psychomotor skills since the results of the first experimental study yielded no statistical significant difference between both groups. Students' views of preferred method of learning psychomotor skills were surveyed by a questionnaire. The author stated, 93% from both groups preferred the traditional way of learning psychomotor skills. The remaining students suggested the combination of both SDL method and traditional way of teaching psychomotor skills.

One paper (Nixon et al.1996); on the other hand, reported a different result in which, SDL improved the psychomotor skills acquisition compared with the traditional method of teaching using RCT design. The findings of this study revealed that, there was a significant difference ($P<0.005$) noted between both groups in the skills performance. SDL group demonstrated a higher level of competence and were more confident in performing psychomotor skills that they learned independently from the computer than the group taught in traditional method.

LEVEL OF SATISFACTION

Three papers (Majumdar et al. 1998, Jeffries et al. 2003 and Gega et al. 2007) aimed to identify students' level of satisfaction from the methods utilised for learning.

Two studies (Jeffries et al. 2003 and Gega et al. 2007) reported that SDL groups were satisfied with computer based SDL method for learning.

One paper (Majumdar et al. 1998) reported a different opinion regarding the level of satisfaction. The results of this study revealed that, there was a significant difference ($P<0.001$) between both groups in the level of satisfaction. The author stated that a high level of satisfaction was reported by the experimental group (93%) which was exposed to traditional method of teaching (DRD), and 100% of them recommended this strategy to be implemented in nursing education; whereas only 30% of SDL group recommended SDL as a strategy of teaching psychomotor skills. In this study the level of satisfaction was measured by a questionnaire.

Problem solving

Two studies (Parfitt 1989 and Gega et al. 2007) reported that SDL method enabled the students to apply critical thinking skills and solve the problems provided to them in the case scenarios.

Parfitt (1989) aimed to identify whether SDL aids students' critical thinking and problem

Solving skills. In this study, the problem solving skills were measured by case scenarios and essay test. The results of the study revealed that, there was a significant difference ($P<0.02$) noted between both groups in the essay test and the case scenarios.

Gega et al. (2007) study; however, did not aim directly to test students' critical thinking and problem solving skills. Nevertheless, the application of skills outcome was measured by case scenarios and students were expected to analyse them and suggest the interventions required relating to the cases provided. Therefore, this type of measurement can still be considered a method of testing students' ability to think critically and solve the problems to be able to identify the interventions. The results of the study revealed that, SDL group planned more interventions than the control group who were exposed to the traditional method of teaching.

SUMMARY

The results of the studies regarding acquisition of knowledge and psychomotor skills by SDL method revealed that, SDL aids the acquisition of knowledge and the students were able

to acquire the skills effectively. Generally, most of the studies reported that SDL is effective but no more than the traditional method of teaching. However, in terms of the students' preference of learning psychomotor skills, two studies (Majumdar et al 1998 and McAdams et al. 1989), reported that, both groups (control and experimental) preferred DRD and recommended it as an effective method for learning psychomotor skills.

Regarding critical thinking and problem solving skills, the results illustrated that SDL method aids students' SDL method aids students'. Although both groups were able to analyse the problems effectively and planned the interventions as required, both studies reported that SDL group planned more interventions than the group exposed to traditional method of teaching.

Finally the results showed that, computer based SDL is as satisfying a method for learning as the traditional method of teaching. However, in terms of learning psychomotor skills, one study reported a high level of satisfaction with the group who learned psychomotor skills by traditional method of teaching.

It was aimed earlier to identify whether a combination of SDL with other teaching methods may yield better outcomes for nursing students. Unfortunately, none of the studies aimed to find out whether combining SDL with other methods of teaching may produce different results.

DISCUSSION

This review's findings regarding knowledge and skills acquisition by SDL approach were reported in other studies (Leflore and Anderson 2009, Norris 1986) which were excluded from the review.

Leflore and Anderson (2009), by conducting an RCT design, reached the same results as this review. The study findings illustrated that students acquired the knowledge by SDL. Nevertheless, overall, there was no statistical difference between the group of graduate nursing students who were exposed to the SDL approach and those having a teacher centred approach in terms of knowledge gain. However, the group having the teacher centred approach demonstrated their skills better than SDL.

On the other hand, opposite findings to the results of this review were obtained in other nursing studies (Wilson 1993, Wichenden 1989) by using the same design (RCT). These studies are doctoral dissertations and the information was obtained from the abstracts and also reported in other studies.

Wilson (1993) found in his study that the SDL group scored significantly higher in their overall academic performance, than the group taught by the traditional method of teaching.

The same results as Wilson (1993) were obtained by Wickenden (1989). The study findings revealed that the SDL group progressed in their study and that learning improved in the clinical setting.

Therefore the interpretation, which could be provided, regarding the diversity of the study findings, is that the success of SDL approach may be associated with the students' styles and preferences of learning. Some students may be ready to take the challenge and be self-directed whereas others may not. However, through the SDL approach the desired level of knowledge and skills that was required to be achieved by the students was successfully achieved according to the findings in different studies.

Furthermore, it was noticed from the reviewed studies (Majumdar et al.1998, Nixon et al. 1996, Love et al. 1989, McAdams et al. 1989) which have specified students' level of study, that all the nursing students were in the junior level (second year nursing students). Much of the literature suggested that junior students prefer a concrete, direct and structured

approach for learning (Levett-Jones 2005, O'Shea 2003). Therefore, this observation may also provide a rationale for this review finding in which no difference was found and students' recommendation was for a teacher centred approach for learning psychomotor skills; although some studies hypothesised that SDL group will perform better than the traditional group in terms of knowledge and psychomotor skills. Therefore, if senior students had been recruited for the studies (level 3 or 4), different results may have been obtained.

Furthermore, in this review, it was expected to find out different results from the studies of (Jeffries et al. 2003 and Gega et al. 2007) which utilised computer-based SDL approach as a method of intervention. This idea was considered because of the effect of technology on learning. However, the findings of those studies revealed that computer based SDL is as effective as the traditional method of teaching and overall, there was no significant difference found between both groups.

On the other hand, this finding is opposite to what Tse et al. (2006) found in their study, which aimed to identify knowledge improvement with computer based SDL in one of the nursing courses. In this pre test and post test study it was found that, post test, the nursing students improved in their level of knowledge in the nursing course and were more satisfied with this approach to learning than a face to face approach. Therefore, the overall conclusion that could be drawn regarding a computer based SDL approach is that it is an effective approach for learning that meets the demands of today's world and is cost effective as well (Tse et al. 2006, Jeffries et al. 2003 and Gega et al. 2007).

CONCLUSION

The focus of this systematic review was to evaluate the effectiveness of SDL on the professional development of pre-registration nursing students. A total of seven papers have been included in this review, of which six papers are RCTs and one is a quasi-experimental design paper. The findings resulted in four themes which are: level of knowledge, acquisition of psychomotor skills, problem solving skill and level of satisfaction. The results of this review revealed that the SDL approach is an effective approach for learning that can be utilised in pre-registration nursing programmes. SDL has been found to facilitate the acquisition of skills, knowledge and problem solving skills effectively. Also, nursing students were overall satisfied with this approach of learning as was highlighted in the majority of the studies. Although most of the studies reached the conclusion that SDL is effective, but not more than the traditional method of teaching, this finding also indicates that it is still considered a successful and a satisfying approach, which can replace pedagogy curricula in nursing education.

However, the in-depth exploration and comparison of this approach to other studies indicated that, certain considerations must be taken into account to ensure successful implementation of SDL in the pre-registration nursing programmes. Learning styles and preferences of the students must be identified at different levels of study. This is important to be able to decide at which level of the study SDL can best be introduced, so that successful results will be obtained. Findings from other studies suggested that, junior or novice students prefer a concrete, direct and structured way of teaching. Therefore, identifying the learning styles and preferences is essential. Also, the decision regarding the subjects which can take SDL pathway and those which may require teachers' input must be carefully planned. This is because some literature suggested that it is unrealistic to cover all teaching materials in nursing curricula with SDL approach, especially in novel situations. Therefore, such consideration must also be taken into account to ensure students' satisfaction with their learning. Furthermore, the findings suggest that the success of SDL programmes is associated with the availability of the resources required for SDL and should include library, laboratory facilities and educators who must be ready to play the correct role in SDL programmes.

Successful management of the environment with all the required facilities will provide a means for effective SDL programmes.

The recommendation that could be suggested is to replicate this review considering qualitative studies and then compare the findings to the quantitative one. This is needed in order to obtain a wider view about SDL and identify the circumstances that encourage or inhibit its implementation in nursing education, with a high degree of certainty.

Reviewing the literature about SDL suggests dearth of research about this approach. Therefore, more research should be conducted.

IMPLICATION FOR PRACTICE

It is envisaged that by studying SDL, it will create a greater awareness in nursing education in developing countries that may enhance re-thinking of the didactic traditional curriculum and replace it with another one that can produce better outcomes; a curriculum which is congruent with today's world changes. In addition, this research will open up an avenue to investigate the needs of nursing students and design a curriculum which meets their demands as adult learners and may contribute to their professional development. Furthermore, it will help inform part of a larger study about the current teaching approaches that are utilised in teaching nursing students in nursing education.

REFERENCES

1. Bryman A (2008) *Social Research Methods*. Oxford University Press: NewYork.
2. Crombie I (1996) *The Pocket Guide to Critical Appraisal*. BMJ Publishing Group: London.
3. Dewey J (1982) *How We Think*. Lexington Mass: London.
4. Egger M, Smith G and Altman D (2001) *Systematic Reviews in Health Care: Meta-analysis in context*. BMJ Publishing Group : London.
5. Garrison D.R. (1992) Critical thinking and self-directed learning in adult education: an analysis of responsibility and control issues. *Adult Education Quarterly* 42 : 136–148.
6. Gega L, Norman I, Marks I (2007) Computer-aided vs. tutor-delivered of exposure therapy for phobia/ panic : Randomized Controlled trial with pre-registration nursing students. *International Journal of Nursing Studies* 44 : 397-405.
7. Gerrish and Lacey (2006) *The Research Process in Nursing* (5th eds). Blackwell Publishing: Oxford
8. Jadad A and Enkin M (2007) *Randomized Controlled Trials: Questions, Answers and Musings* (2nd eds). Blackwell Publishing Ltd : Oxford.
9. Jeffries P, Woolf S and Linde B (2003) A Comparison of Two Methods for Teaching the Skill of Performing a 12- Lead ECG. *Nursing Education Perspectives* 24 (2) : 70-74.
10. Knowles M (1975) *Self-Directed Learning: A Guide for Learners and Teachers*. Follet: Chicago.
11. Knowles M (1984) *Andragogy in Action: Applying Modern Principles of Adult Learning*. Jossey-Bass: San Francisco.
12. Knowles' Postulates of Adult Learning. Accessed online on 28/07/09.
13. http://leanlearning.wikispaces.com/instructional_design#knowles_postulates
14. Landers M (2000) The Theory-Practice gap in nursing: the role of the nurse teacher. *Journal of Advanced Nursing* 32 (6): 1555-1556.
15. LeFlore J and Anderson M (2009) Alternative Educational Models for Interdisciplinary Student Teams. *Simulation in Healthcare* 4 (2) : 1-8.

16. LeFlore J, Anderson M, Michael J, Engle W and Anderson J (2007) Comparison of Self-Directed Learning Versus Instructor-Modeled Learning During a Simulated Clinical Experience. *Simulation in Healthcare* 2 (3) : 170-176.
17. Leonard D (1993) Workplace education: adult education in a hospital nursing staff development unit. *Journal of Nursing Staff Development* 9 : 68–73.
18. Levett- Jones T (2005) Self – directed learning: implication and limitation for undergraduate nursing education. *Nurse Education Today* 25 :363 -368.
19. Love B, McAdams C, Patton D, Rankin E and Roberts J (1989) Teaching psychomotor skills in nursing: a randomised control trial. *Journal of Advanced Nursing* 14: 970-975.
20. Majumdar B (1998) Comparison of Self and Faculty Directed Learning of Psychomotor Skills. *Advances in Health Sciences Education* 3 :15- 29.
21. McAdams C, Rankin E, Love B and Patton D (1989) Psychomotor skills laboratories as self directed learning : a study of nursing students' perceptions. *Journal of Advanced Nursing* 14: 788-796.
22. Nixon M, Morgan L, Forsyth J and Ellis D (1996) A comparative study of teacher directed and self directed methods of teaching clinical skills to undergraduate nursing students. *International Journal of Nursing Practice* 2 : 88-93.
23. Norris J (1986) Teaching Communication Skills : effects of Two Methods of Instruction and selected Learner Characteristics. *Journal of Nursing Education* 25 (3) : 102- 106.
24. O'Shea E (2003) Self directed learning in nursing education: A review of the literature. *Journal of Advanced Nursing* 43(1) : 62- 70.
25. Parfitt B (1989) A practical approach to creative teaching an experiment. *Journal of Advanced Nursing* 14:665-677.
26. Prociuk L (1990) Self-directed learning and nursing orientation programs: are they compatible. *The Journal of Continuing Education in Nursing* 21: 252–256.
27. Punch K (2009) Introduction to Research Methods in Education. SAGE Publication Ltd : Los Angeles.
28. Quinn F and Hughes S (2007) *Principles and Practice of Nurse Education* (5th eds). Nelson Thornes: Cheltenham.
29. Race P (1990) *The Open Learning Handbook*. Kogan Page : London.
30. Rees C (2003) *Introduction to Research for Midwives* (2nd eds). Elsevier: Edinburgh.
31. Regan J (2003) Motivating students towards self directed learning. *Nurse Education Today* 23: 593-599.
32. Sauerland S and Seiler M (2005) Role of Systematic Reviews and Meta-analysis in Evidence-based Medicine. *World Journal of Surgery* 29: 582–587.
33. Schmidt H (2000) Assumptions underlying self-directed learning may be false. *Medical Education* 34: 243- 245.
34. Slevin O and Lavery M (1991) Self-directed learning and student supervision. *Nurse Education Today* 11 : 368-377.
35. Sparling L (2001) Enhancing the Learning in Self-Directed Learning Modules. *Journal for Nurses in Staff Development* 17 (4): 199–205.
36. Tse M, Sandra R and Chan M (2007) Pedagogy for Teaching and Learning Cooperatively on the Web: A Web- Based Pharmacology Course. *Cyber Psychology and Behavior* 10 (1) : 32- 37.
37. Wickenden A (1989) Self directed learning in nurse education: A case study on an orthopaedic ward. *Doctoral Abstracts International* : 3112.
38. Wilson B (1993) Comparison of two teaching strategies for teaching basic nursing skills to baccalaureate nursing students. *Doctoral Abstract International*: 2233.