

TEAM BASED LEARNING IN NURSING AND MIDWIFERY HIGHER EDUCATION; A SYSTEMATIC REVIEW OF THE EVIDENCE FOR CHANGE

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Acknowledgements to Dr Steve Lui, University of Huddersfield, for support with the literature searching

Word count: 4751 (excluding references)

ABSTRACT

Review Aim

The aim of this study is to review the evidence in relation to the experiences and outcomes of students on nursing and/or midwifery higher education programmes, who experience team based learning.

Review Objectives

To examine the relationship between team based learning and attainment for nursing and midwifery students in professional higher education

To examine the relationship between team based learning and student satisfaction for nurses and midwifery students in higher education

To identify and report examples of good practice in the implementation of team based learning in Nursing and Midwifery higher education

Design: A systematic Review of the literature was undertaken. The population were nurses and midwives studying on higher education pre and post registration professional programmes. The intervention was learning and teaching activities based on a team-based learning approach.

Data sources included CINAHL and MEDLINE. ERIC and Index to Theses were also searched.

Review methods: International research papers published in English between 2011 and 2017 that met the inclusion criteria were included in the study. Papers that met the criteria were subjected to quality appraisal and agreement amongst authors for inclusion in the review.

Results: A total of sixteen papers were reviewed and four themes emerged for discussion. These were Student Engagement, Student Satisfaction, Attainment and Practice Development and Transformational Teaching and Learning.

Conclusions: There is a tentative, though growing body of evidence to support TBL as a strategy that can impact on student engagement, student satisfaction, attainment, practice development and transformative teaching and learning. The literature indicates that implementing TBL within the curriculum is not without challenge and requires a sustained and structured approach. Staff and students need to understand the processes involved, and why they should be adhered to, in the pursuit of enhanced student experiences and outcomes for nurses and midwives in Higher Education.

Key Words:

Team-based Learning; nursing; midwifery; student-engagement, student-satisfaction, student-attainment; practice-development; transformative-learning

Introduction and Background

There are many drivers for changing the way we deliver higher education for health professionals. Primarily we need to respond to the global changes to the delivery of health services. Global demographic and societal changes that include wide variations in life expectancy (OECD, 2015), significant inequalities in health that impact on health and wellbeing for different reasons. For example, there is a rise in the middle classes and the need to deliver long term care and chronic disease management to an aging population that is driving the transformation of health service financing and delivery. Conversely, according to the Central intelligence Agency (2013) 18.4% of the world population were living in extreme poverty with limited or no access to healthcare. There is a therefore a global need for long-term cost savings and better patient outcomes and it is imperative that health professionals are enabled to practice confidently and competently, think independently and make clinical decisions based on a sound evidence base in order to drive these changes forward. There is a critical need for leaders who can inspire confidence within their colleagues and manage resources strategically, for leaders with vision who instil confidence in service users. The challenge for educators in higher education today is to ensure that the product we deliver, our graduates, are ready to become those dynamic leaders of future health service delivery. The challenge is to deliver a curriculum in which our students can thrive, to create an environment that nurtures confidence and growth, an environment that respects individuality and diversity, an environment in which students learn to hear their own voices and truly understand themselves and their place in the world around them. This challenge is set against a background of change; changes in the expectations of students and policy changes that underpin and drive change forward. The study reports on a systematic review of the literature on Team Based Learning (TBL) in nursing and midwifery higher education, and critically explores its capacity for driving change and improving key performance indicators.

Policy Context

From a UK perspective the government has published its 2016 HE White Paper, entitled *Success as a Knowledge Economy: Teaching Excellence, Social Mobility and Social Choice*. The proposals outlined aim to drive improvements in the quality of teaching, safeguard the development of graduates fit for employment and ensure that universities deliver higher education that is value for money. The white paper also paves the way for a link between quality and student tuition fees. At the same time, the non-refundable bursaries that have long supported student nurses and midwives through their undergraduate studies are to be withdrawn in England and from September 2017 these students will be fee paying through the student loan system, which requires re-payment through taxation following graduation. Internationally, the education and training for nurses and allied health professionals is almost exclusively at a graduate level and likely to be subject to similar tensions in relation to quality and funding.

Further, it is vital that nurses and midwives are prepared for the complex roles and responsibilities required of them in the multifaceted health care environment of today (Nursing and Midwifery Council, 2015). Health Education England (2016) also make recommendations to support and advance the quality and standards of education “*from Care Certificate level to PhD and beyond*” and a career structure that will unleash potential to the benefit of the health and care workforce; to patients and communities.

To unleash such potential, an empowering education that will nurture the personal qualities of resilience and self-management is required. We also need students who are engaged and motivated

and it is within this context that innovative approaches to delivering high quality learning experiences, that represent value for money and deliver student satisfaction and attainment, become vital. However, these drivers should be seen as a positive impetus to change as there is evidence that traditional approaches to learning and teaching no longer deliver the outcomes we desire (Gibbs, 2013) and often fail to motivate students. Many studies suggest that collaborative learning, where emphasis moves from the passive participant to active involvement, develops greater thinking skills and problem solving abilities (Michael 2006, Martin et al 2008, Mechemer & Crawford 2007). The NUS student experience study (2012) reported that students consistently commented that they wanted more interactive classes. This was not just so that they could acquire the content, but also to develop peer relationships with their classmates, which they linked to good future employability skills.

TBL is a collaborative learning and teaching strategy designed around units of instruction that are taught in a three-step cycle: preparation (this may take the form of pre-reading and/or purposely designed study materials, which may be text/visual/other). Students then complete an in-class individual readiness assurance test (IRAT), consisting of 5 to 20 multiple choice questions. After submitting their individual answers, they take the same test with their team, the team RAT (TRAT). All members of each team share the same TRAT score, and both IRAT and TRAT scores count toward the students' grades (TBLC 2017). This is important, as it provides a real incentive for students to learn materials beforehand, attend classes, and contribute to team discussions. The third stage of the process revolves around application exercises, undertaken within the teams, which help students learn how to apply and extend the knowledge that they have pre-learned and tested (TBLC 2017).

This systematic review of the literature has been undertaken as precursor to, and to inform, large scale curriculum development in health higher education delivery aimed at improving student attainment, engagement, satisfaction and transformational growth, through the implementation of TBL across three core modules. The scale of the proposed changes mean that there is an element of risk involved and therefore it was anticipated that this review would provide insight into the chances of success and the factors that might facilitate greater success.

REVIEW AIM

The aim of this study is to review the evidence in relation to the experiences and outcomes of students on nursing and/or midwifery higher education programmes, who experience team based learning.

Review Objectives

The objectives of the review were to examine the relationship between team based learning, student satisfaction and attainment for nursing and midwifery students in professional higher education and to additionally identify and report examples of good practice in its implementation.

Review Protocol

See table 1 for review protocol

METHODOLOGY

The review process was informed by Moher (2009) and the Centre for Reviews and Dissemination (2009) and involved a systematic review of the literature to examine the experiences and outcomes

of staff and students on Nursing and Midwifery higher education programmes, who experience TBL. Examples and models of good practice were also identified in the literature and reported. An audit trail of the review process is documented for the purpose of transparency.

Search Strategy

Search terms used included *team based learning, nurse, nurses, nurse practitioner, midwife, midwives, midwifery*. See table 2.

Sources of Data

Data bases searched included CINAHL, Medline and ERIC.

Searching Other Sources

References of research papers included in the review were screened and the Index to Thesis was checked for suitable records.

Study Selection

Study selection was undertaken using the pre-specified inclusion and exclusion criteria generated from the review protocol (PICOS see Table 3). Titles and abstracts of retrieved studies were examined systematically by one review author, with a second review author examining borderline papers to determine eligibility for inclusion against the inclusion criteria. The Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) template was used to record the literature search and selection as a mechanism for promoting transparency and creating an audit trail (Table 4).

Critical Appraisal and Quality Assessment

The quality assessment criteria applied within this review involved the exclusion of all papers that were not either primary or secondary research. This was done to ensure that the best available evidence was used. Quality assessment of all papers was undertaken based on the following questions, adapted from the Centre for Evidence Based Medicine (2016) and the work of Crowe and Sheppard (2011):

1. Does this study address a clearly focused question/aims/objectives?
2. Did the study use valid methods to address the question/aims/objectives?
3. Have ethical matters been addressed?
4. Are the valid results of this study important?
5. Are these valid, important results applicable to my population?

Data Extraction

Data were extracted from studies under the following domains: author, date of publication and country, brief description of study, professional orientation and level of study, positive student/staff experiences and outcomes, negative student/staff experiences and outcomes and favourable or transformational educational practice

Data Synthesis

The aim of this literature review was to review the evidence in relation to the experiences and outcomes of students on nursing and/or midwifery higher education programmes, who experience TBL and to identify and report examples of good practice in the implementation of TBL in Nursing and Midwifery higher education. Therefore, key issues and findings from included studies, relating to positive and negative staff and student experiences and outcomes, are reported and set out in narrative format and in a summary of findings table (Table 4). Four key themes emerged and are reported on here. These were, Student Engagement, Student Satisfaction, Attainment and Practice Development and Transformational Learning and Teaching.

FINDINGS

Student Engagement

Student engagement can be defined as the interaction of students' in-class with other learners and instructors (Kelly et al, 2010) and also with associated learning materials, which may sit out of class time. It requires motivation, passion, curiosity, interest and attention and it is asserted to be higher if learning processes are active as opposed to passive (Kelly et al, 2010).

Three papers had adequate methodological quality to be included in this theme (Mennenga, 2013; Currey, Oldland, Considine, Glanville & Story, 2015; Whittaker, 2015). Mennenga (2013) studied undergraduate baccalaureate nursing students using a non-randomised comparative group design. The control group (n=74) was primarily taught using traditional lectures and the experimental group (n=69) used a TBL approach. The ordinal classroom engagement survey was used to capture engagement. Results showed a significantly higher level of engagement with TBL as compared to lectures ($p < 0.001$).

Currey et al (2015a) evaluated student engagement by using a pre/post mixed-methods design with a single group of nursing students (n=32) who were being taught using traditional and then TBL approaches. They used three measures to capture student's engagement. These the STROBE observational tool which is a validated tool of student engagement (O'Malley et al, 2003, cited by Kelly et al, 2010), the students' self-report of engagement measure and the standard university measure of engagement called the Student Evaluation of Teaching and Units (SETU). STROBE data highlighted high levels of interaction in TBL classes, compared to no interactions in standard lectures. Self-reported engagement was higher for TBL ($p = 0.05$) and the qualitative results captured by the SETU cited 18 of 23 nominating TBL as the best aspect of the unit. However, results from this study should be viewed cautiously as the SETU is a un-validated, surrogate measure of engagement and the self-reports of engagement measure stated it would be subjected to content analysis but this was not evident, instead a p-value was presented with no explanation of what statistics were applied to achieve it.

Whittaker et al (2015) compared TBL with traditional instructor led (IL) learning and found significant increases in student self-regulated learning; measured by comparing the amount of pre-class online viewing time ($p < 0.001$). They used a non-randomised sample comparing 98 undergraduate (UG) student nurses who were taught using an IL approach against 86 UG student nurses who were taught the same content the following year using a TBL approach. It was unclear whether the pre-class online materials were the same for both groups and whether the readiness assurance tests were summatively assessed, which might have impacted the results. However, the study was adequately powered providing some confidence to their findings.

Student Satisfaction

Literature relating to student satisfaction arose from Korea or the USA. There were four papers that examined undergraduate nursing cohort perceptions of TBL (Clarke et al. 2008; Mennenga, 2015; Rho et al. 2014; Roh et al. 2015). Clarke et al. (2008) combined a group comparison with a pre-test and post-test evaluation to investigate differences in student engagement and attitudes regarding the value of team work. Poor control of potentially influential variables; topic, use of different teaching staff between groups and narrow experience of staff in delivering TBL limit the validity of their results. In addition the short duration of the study restricted any long term generalisations from being made. Results showed higher participation and enjoyment in the TBL sessions than a standard lecture but with some reluctance amongst students to be parted from the direction offered by PowerPoint delivery and didactic communication of important information. Attitudes regarding the value of team work did not change significantly after exposure to the TBL format.

Mennenga (2015) recorded data from two cohorts (1st and 2nd year of implementation), using the validated Team-Based Learning Student Assessment Instrument, and undertook descriptive statistical analysis. Course evaluations were also analysed as part of the study. Both cohorts reported high levels of accountability with TBL. Levels of student satisfaction, preference for TBL over lectures and overall experience were also measured and the two groups compared; both cohorts were generally satisfied with TBL although the second group scored higher in all domains; this was accounted for by improved staff performance and confidence in the TBL approach.

Two Korean studies (Rho et al. 2014; Roh et al. 2015) reported findings from TBL specific satisfaction questionnaires completed by 2nd year undergraduate nurses following 4 hours of TBL provision. Both studies suggest TBL satisfaction is driven by the following factors: Learning process, pre-assignment, course content, peer evaluation and team activity (Roh et al. 2014), Team learning, self-directed learning and faculty feedback (Roh et al. 2015). As for Clarke et al. (2008) the lack of exposure time presents a risk for positive bias and further longer term studies are required into student levels of satisfaction related to TBL.

Attainment and Practice Development

Five papers and one thesis had adequate methodological quality to be included in this section. (Bouterie-Harmon and Hills, 2015; Cornelius, 2014; Kyung-Ah et al, 2016; Park et al. 2014; Whittaker, et al. 2015) Four of the papers used a pragmatic approach to their research comparing cohorts undertaking traditional teaching approaches with cohorts participating in TBL whilst Kim et al (2016) truly randomised their participants.

Student attainment was measured by traditional means in two of the papers; Kim et al (2016) utilised multiple choice questions (MCQs) relating to clinical knowledge as did Kyung-Ah et al, 2016. Both these outcome measures showed significantly improved knowledge in the group using TBL although Kyung-Ah et al, 2016 showed that this increase in performance was only significant for lower achieving students.

Whittaker et al (2015) also demonstrated improved attainment in the TBL group, who scored significantly higher in course examinations. A significant association between iRAT and examination scores was found by Park et al. (2014) with the suggestion that self-directed learning facilitated individual preparation, which motivated students to study on a regular basis and thereby improve their comprehension. However, whilst they note the correlation between iRATS and examination scores, there is no evidence in this study that overall examination scores improve using the TBL approach rather than other approaches to learning and teaching.

Practice development was measured indirectly; both Kyung-Ah et al, 2016 and Bouterie-Harmon and Hills (2015) used practice related examinations to investigate the efficacy of TBL and Kim et al (2016) utilised a clinical performance measure. The simulation assessment used by Kyung-Ah et al, (2016) did not show significant differences between groups but Bouterie-Harmon and Hills (2015) and Kim et al (2016) both demonstrated that students using TBL had significant improvement in their practice examinations ($p < 0.01$ and $p < 0.001$ respectively).

Performance in practice was also assessed using clinical decision making scales measured by the validated Clinical Decision Making for Nurses Scale (CDMNS) as used by Cornelius (2014). Her thesis looked at the relationship between TBL and applying theoretical knowledge in practice. She showed only a weak relationship between using TBL and an improved CDMNS score with no significant differences between the cohorts using traditional methods and TBL. However when looking at the CDMNS longitudinally it does appear that students having the TBL approach do make greater gains ($p = 0.037$). Cornelius (2015) did not recruit sufficient numbers to give adequate power to the results.

There were no experiences reported about practice development however increased clinical problem solving abilities and improved simulated clinical performance were associated with the cohorts undertaking TBL (Cornelius, 2015; Kim et al, 2016; Kyung-Ah et al, 2016), both of these aspects can be seen as positive attributes relevant for practice development.

Transformational Teaching and Learning

In this section we categorised papers that captured the wider impact of TBL on accountability and the skills associated with independent learning and personal growth, areas which are often referred to as the transformational aspects of learning (Mezirow 1991) which we are particularly interested in developing. Seven papers were included in this section; this included Whittaker (2015), whose work spanned this review and contributed additionally to the student engagement and the student attainment and practice themes; and Mennenga (2015) who's work also contributed to the student satisfaction section. Other authors for consideration in this section include Cheng, Liou, Hsu, Pan, Liu & Hao (2014), Considine, et al. (2012), Considine, et al. (2014), Currey, Eustace, Oldland, Glanville & Story (2015) and Park et al. (2014).

A number of studies identify the potential for improved performance in practice after TBL programmes with an increase in interpersonal skills, which are relevant to core health practitioner competencies. For example, Considine et al (2014) undertook a prospective exploratory study to examine participant experiences of TBL. The sample was 49 registered nurses who had participated in an education programme and the study utilised two paper based evaluation forms, collecting qualitative and quantitative information. An extended response questionnaire was then used to elicit qualitative responses related to learning. The results identified two key themes, quality of learning and positive team experience with the conclusion that TBL was a positive learning experience on an individual and team basis. Considine et al. (2014) suggest that the enhanced high quality learning and positive experience of learning in teams has the potential to enhance clinical outcomes, which support the thinking of Mennenga, (2015).

The effect TBL processes on team working skills and recognition of the value of teams was also reported (Cheng et al. 2014, Mennenga 2015, Park et al. 2014). Cheng, et al. (2014) discuss a one group pre-test- post-test study with 104 maternal and child nursing students following the intervention of TBL. Three scales were used to evaluate the effects of TBL on three specific elements; classroom engagement, value of teams and self-directed learning. Statistical analysis demonstrated that TBL significantly influenced all three elements with the addition of students perceiving that they had better academic achievement after TBL. Cheng et al. (2014) propose that high self –directed

learning scores support professional growth and cultivate life-long learning abilities. Similarly, Park, et al. (2014) undertook a prospective, one group pre and post-test study with 74 second year nursing students and found a significantly positive effect on team interpersonal skills; the authors note the relevance of this in relation to the core nursing competencies of listening, reflection and validation. They relate these outcomes to the interactive process of reaching a consensus for team based assessments.

Students engaged in TBL demonstrate a motivation to learn and willingness to participate (Cheng et al. 2014; Currey et al. 2015, Park et al. 2014, Whittaker 2015). Currey et al. (2015b) report on an investigation into the perceptions and experiences of TBL with critical care postgraduate nursing students. Thirty two students participated in a paper based extended questionnaire. The overarching positive outcome for students was professional growth with four themes, engagement, learning effectiveness, critical thinking and the motivation to participate. Currey et al. (2015b) purport that as TBL facilitates critical reasoning and team working nurses are empowered to provide safe care with confidence.

Considine et al. (2012) report on the outcomes of a TBL programme implemented to prepare registered nurses, working in emergency settings to order nurse initiated X-rays (NIXRs). The study was based in a district hospital and data was collected via a sample of 300 x-ray request forms, which were audited by a single researcher using a paper based audit tool. Outcomes indicated that nurses who had undertaken the educational programme outperformed nurses who had undertaken ad hoc education related to NIXR and the authors highlight the relationship between this outcome and the intentions of TBL, which are to focus on knowledge application, rather than knowledge transmission.

Discussion

The literature related to TBL as a teaching strategy for nurses and midwives is limited and inconclusive. The contemporary literature does not identify any significant negative experiences of TBL on nursing or midwifery students, although it can be reasonably assumed that it is advocates of TBL who aim to promote it as a teaching and learning strategy. It is also clear from the literature that there are limited numbers of staff engaged in the systematic evaluation of TBL and several of the papers reviewed, whilst providing different perspectives, did report on the same TBL activity.

Improving student engagement in the learning process is a key objective in any change in learning and teaching strategy and there is some clear evidence of increased student engagement and interaction in their learning (Mennenga, 2013, Bouterie-Harmon and Hills, 2015; Whittaker et al. 2015). In keeping with an earlier review of the literature on TBL conducted by Sisk (2011) these papers suggest significantly higher student engagement as an outcome of TBL, as compared to a traditional, more didactic, approach. However, none of them are UK based which may limit their generalizability and there is heterogeneity in approach and measures used so this conclusion should be viewed with caution until further study is undertaken.

There are no robust research designs in any of the papers that gathered the subjective experiences of the students experiencing TBL, therefore student satisfaction was difficult to determine conclusively, although there was overall indication of satisfaction. Rho et al. (2014), Rho et al. (2015) and Mennenga (2015) report from cumulative data comparing new undergraduate cohort experiences of TBL. We report these as separate analyses as they contribute distinct findings on the topic and provide an insight into implementation strategies and how they are received by students.

In the Mennenga (2015) study, the course evaluations indicated an initial dip in student satisfaction with teaching (cohort 1) followed by a significant increase to above the pre-TBL rating when student satisfaction was evaluated a two years after TBL had been implemented. In the cross sectional descriptive survey by Roh et al. (2014) the highest satisfactions scores were associated with “A deeper understanding of the subject through team activity.” The positive satisfaction is also linked to students enjoying the opportunity to engage in clinical problem solving during the team activities. This study also found that satisfaction was higher in the second cohort to undertake TBL indicating that the organisation or course material may have improved after the initial running.

Also of interest are the changes that Mennenga (2015) report as a result of the changes to the curriculum design, for example the realisation that the pre-reading that had been previously used, needed to be replaced by something at a more appropriate level to the students requirements. Making significant changes to the curricular therefore created an opportunity for staff to significantly review their teaching materials. The key learning from the work of Rho et al. (2014), Rho et al. (2015) and Mennenga (2015) is that there may be some challenges and resistance to the change initially, but staff should maintain a positive approach and adapt accordingly to the challenges to enable an improved student experience. With appropriate support, Mennenga (2015) reported that transformational change occurred and students shifted from being passive to active learners, taking accountability with improved satisfaction.

The most positive aspect identified in the studies reviewed is that the TBL approach appears to ensure higher student attainment levels, which are especially prevalent amongst lower achieving students (Bouterie-Harmon and Hills, 2015; Cornelius, 2014; Kyung-Ah et al, 2016; Sisk et al 2014; Whittaker, et al. 2015). This is an interesting phenomenon given that there is some evidence of weaker students claiming a preference for a more passive lecture approach to learning (Sisk et al 2014; Roh, et al 2015). There is also evidence of student resistance towards the number of assessments in the TBL process and whether all IRATS and TRATS should count towards summative grades (Sisk et al 2014). Overall however, there is a satisfying link between reported instances of higher attainment alongside increased student engagement and interaction with the learning processes of TBL. For example, in the course evaluation study undertaken by Bouterie-Harmon and Hills (2015) the students *“overwhelmingly reported that time spent in collaborative discussion with small groups of peers was helpful to their learning.”* The same study also reported that students spent greater time studying outside class.

In terms of transformational development as an outcome of TBL, there was evidence in this review to suggest that TBL facilitates critical reasoning and team working, which empowers nurses to provide safe care with confidence (Currey, et al. 2015b). There was also evidence to support the view that the processes of TBL have a role to play in the development of independent, self-regulated learning, resulting in learner effectiveness improved comprehension and critical thinking.

Conclusion and recommendations

The roles and responsibilities of nurses and midwives in contemporary health care practice demands practitioners who have developed critical thinking and problem solving skills, with the ability to work independently and in a team. This is reflected in the HEE (2016) call for the development and implementation of curricula and assessments that responds to the emerging models of care and service transformation. It is therefore highly relevant to acknowledge the tentative, though growing body of evidence to support TBL as a learning and teaching strategy that can impact on student engagement, student satisfaction, attainment and practice development and transformative teaching and learning. The literature indicates that implementing TBL within the curriculum is not

without its challenges and requires a sustained and structured approach. Staff and students need to understand the processes involved and why they should be adhered to in the pursuit of enhanced student experiences and outcomes. TBL offers an approach to learning and teaching that is worthy of further exploration and evaluation in relation to its capacity to deliver such transformative learning for nurses, midwives in HE.

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Table 1. Review Protocol

		Inclusion Criteria	Exclusion Criteria
Population	Student nurses, student midwives, nurses, midwives	Home and International Students Undergraduate Post-Graduate Pre-registration Post-registration Higher Education Setting	Non-Health Care Education Non-Nurse/Midwifery Education Further Education Doctoral Primary or Secondary Education
Intervention	Team-based learning		
Comparator	Traditional lecture approaches to teaching & learning		
Outcomes	Progression, completion, attainment, retention, attrition, student satisfaction, student dissatisfaction,		
Study	International research papers	Published in English between 2011 and 2017	Non-research Literature Published before 2011

Table 2. Search Strategy Used in Cinahl and Medline and applied to other Databases

#	Query	Results
S1	(team AND based AND learning).	1667
S2	NURSE MIDWIVES/ OR NURSE PRACTITIONERS/ OR NURSES/	54244
S3	nurs*.	365962
S4	midwife OR midwives OR midwifery	18072
S5	2 OR 3 OR 4;	398369
S6	1 AND 5	357
S7	6 [Limit to: (Language English) and Humans];	276

Table 3. PRISMA Flow Diagram

Records identified through data base and other sources
CINAHL (<i>n</i> = 320)
Medline (<i>n</i> =276)
Eric (<i>n</i> = 0)
Index to Thesis (<i>n</i> = 0)
Records Excluded at title and duplicates removed
CINAHL (<i>n</i> = 296)
Medline (<i>n</i> = 269)
Eric (<i>n</i> = 0)
Index to Thesis (<i>n</i> = 0)
Records Excluded at abstract
CINAHL (<i>n</i> = 9)
Medline (<i>n</i> = 2)
Eric (<i>n</i> = 0)
Index to Thesis (<i>n</i> = 0)
Records Removed at Quality Review
CINAHL (<i>n</i> = 4)
Medline (N=0)
Eric (<i>n</i> = 0)
Index to Thesis (<i>n</i> = 0)
Records included in review
CINAHL (<i>n</i> = 11)
Medline (N=5)
Eric (<i>n</i> = 0)
Index to Thesis (<i>n</i> = 0)

Table 4. Summary of Results Table: Annotated bibliography of experiences and outcomes among students on Nursing and Midwifery professional education programmes, who have experienced TBL

Author, Date of publication and Country	Professional Orientation	Positive Student outcomes/experience	Negative student outcomes/ experience	Gaps/further research required or suggested
Student Engagement				
Currey, J., Oldland, E., Considine, J., Glanville, D., Story, I. (2015) Australia	Critical care nurses 32 post grad students extended q on perceptions of TBL (as part of a larger study)	Student’s perceived professional growth was accelerated due to TBL. Four themes – engagement, learning effectiveness, critical thinking, motivation to participate.	None reported	None discussed
Mennenga, H. (2013) USA	Undergraduate baccalaureate nursing students (n=74 Control; n=69 TBL)	Student engagement-significantly more engaged in the classroom with TBL as compared with lectures Student satisfaction-generally satisfied with TBL Student attainment-significant within group improvement was found but there was between group comparability	None reported	Small sample size and limits to generalizability acknowledged
Whittaker, A. (2015) USA.	Undergraduate baccalaureate nursing students (n=98 instructor-led; n=86 TBL)	Student engagement-higher levels of self-regulated online learning with TBL approach Student Attainment-significantly higher examination results with TBL approach	None reported	Homogeneity of the sample limits generalizability. Limitations identified with measure used. Further research required on the impact of each TBL component on self-regulated learning
Student Satisfaction				
Clark, et al. (2008) USA	Undergraduate nursing	Results showed higher participation and enjoyment in the team based learning module	Lack of a PowerPoint presentation to guide study. Students also felt the self-direction of TBL could lead to important information being missed.	Further comparison of how grades were affected and consideration of TBL effects on preparation for entering complex work environments.
Mennenga, H. (2015) USA	Undergraduate baccalaureate nursing students, 1 st and 2 nd years	Both cohorts reported high levels of accountability with TBL. Both cohorts were generally satisfied with TB. The second group scored higher in all	Students reported less student satisfaction in year one; but this increased significantly in year two. This was accounted for by increased staff confidence and experience.	No significant evidence of increase in student attainment. More research required for this.

		domains: student satisfaction; preference for TBL over lectures and overall experience.		
Roh et al. (2014), Korea	Undergraduate nursing students	Survey results indicate five key factors influenced higher satisfaction with TBL against traditional delivery:- Learning process, pre-assignment, course content, peer evaluation and team activity		Studies with longer intervention periods to assess longitudinal outcome of TBL.
Roh et al. (2015), Korea	Undergraduate nursing students	Increased satisfaction was predicted by Team learning, self-directed learning and faculty feedback		Further studies into efficacy of TBL should consider individual and team characteristics, context and teacher decisions.
Attainment and Practice Development				
Bouterie Harmon, R. and Hills, R.L. (2015) USA	4th year Psychiatric Mental Health Nursing students.	End of practice exit examination scores increased from 843 – 939 with t test showing significance (p<0.01) Students studying less than 1 hour per week decreased.	Students in intervention group did have to purchase an online package that allowed them to access material.	The purchased package may have impacted on exit examinations – more research could be undertaken using tutor made resources. The qualitative aspects need to be done in a more structured manner with a transparent audit trail of themes. The self-directed study times could be audited/researched in a more reliable way.
Cornelius, P. (2014). USA	Pre-license nursing students	No significant positive aspects measured for students using TBL	No significant negative aspects measured for students using TBL	The CDMNS was used in different ways to measure whether clinical decision making is improved with TBL. No triangulation using other measures of clinical decision making. Should be repeated with larger sample and more than one measure.

				Lots of demographic information obtained in this research but low numbers prevented and further correlations to be undertaken. With a larger sample this could be done to look at age/gender and the ability to clinical decision make.
Kim, R.H., Song, Y., Linquist, R., Kang, H. Y. (2016) (2016) South Korea	3rd year nursing students.	Increased problem solving skills and improved clinical performance.	No negative impacts observed	Larger scale research measuring clinical performance by independent (blinded) educators/mentors. Qualitative research looking at performance in actual clinical areas using both students and mentors as participants
Kyung-Ah, K., Shin-Jeong, K., Jina, O., Sunghee, K. and Myung-Nam, L. (2016) South Korea	Nursing students. Not explicit as to whether these nurses were pre-registration of post registration.	Students who were classed as lower achievers in their pre-course test (LO1) did significantly better in their post-course test (LO1) in the TBL group ($p=0.002$). As with other papers the GRAT test scored significantly higher than IRAT scores.	No negative impacts for students observed. No staff measurements were collected for impact on staff.	No student satisfaction was measured. Would be interesting to correlate scores with scores from placement area to establish any impact on student practice.
Whittaker (2015) USA.	Undergraduate baccalaureate students (n=98 instructor-led; n-86 TBL)	Student engagement- higher levels of self-regulated online learning with TBL approach Student Attainment- significantly higher examination results with TBL approach	None reported	Homogeneity of the sample limits generalizability. Limitations identified with measure used. Further research required on the impact of each TBL component on self-regulated learning
Transformative Teaching and Learning				
Cheng C. Y., Liou S.R; Hsu T. H., Pan M.Y., Liu H.C., Hao C., (2014) Taiwan.	Maternal child nursing course	Student improvement in learning behaviours, classroom engagement, value placed on teams and self-directed learning. Students felt they had better academic achievement. Study	No negatives reported for students. Staff need to develop confidence and be well prepared.	Need to establish real, causal relationship between effect of TBL and LO's. Recommends controlled trial studies for stronger experimental evidence.

		<p>identified strong influence on students' academic performance.</p> <p>Professional growth, willingness to practice clinically after graduation, lifelong learning abilities. Help them face multi –team work environments</p> <p>For staff cost effective in comparison to PBL</p>		
<p>Considine, J., Payne, R., Williamson, S. & Currey, J. (2012)</p> <p>Australia</p>	<p>Emergency Nurses, Post Registration</p>	<p>Students outperformed those who had undertaken the NIXR training on an ad hoc basis</p>	<p>Non-reported</p>	<p>Student experience and perceptions of the learning experience</p>
<p>Considine, J., Currey, J., Payne, R., Williamson, S. (2014)</p> <p>Australia.</p>	<p>Critical care nursing students (N=49)</p> <p>(Post Graduate)</p>	<p>Powerful educational strategy increasing student's engagement with self as a learner, colleagues and clinical team. Professional growth and confidence. Higher level critical thinking , problem solving, valuing team based solutions</p> <p>Exciting for learners and teachers</p> <p>Main outcome engagement, learning effectiveness, critical thinking, motivation to participate</p>	<p>Non-reported</p>	<p>None discussed</p>
<p>Currey, J., Eustace, P., Oldland, E., Glanville, D., Story, I. (2015b)</p> <p>Australia.</p>	<p>Critical care nursing students</p> <p>(N=32)</p> <p>Post Graduate</p>	<p>Postgraduate students perceived their professional growth was accelerated due to the skills and knowledge acquired through TBL. Four themes underpinned the development and accelerated acquisition of specialty nurse attributes due to TBL: Engagement, Learning Effectiveness, Critical Thinking, and Motivation to Participate.</p> <p>Team-Based Learning offered deep and</p>	<p>Non-reported</p>	<p>None discussed</p>

		<p>satisfying learning experiences for students.</p> <p>The early acquisition of advanced critical thinking, teamwork and communication skills, and specialty practice knowledge empowered nurses to provide safe patient care with confidence.</p>		
<p>Mennenga, H. (2015)</p> <p>USA</p>	<p>Undergraduate baccalaureate nursing students, 1st and 2nd years</p>	<p>Both cohorts reported high levels of accountability with TBL.</p> <p>Both cohorts were generally satisfied with TB. The second group scored higher in all domains: student satisfaction; preference for TBL over lectures and overall experience.</p>	<p>Students reported less student satisfaction in year one; but this increased significantly in year two. This was accounted for by increased staff confidence and experience.</p>	<p>No significant evidence of increase in student attainment. More research required for this.</p>
<p>Park H.R., Kim, C.J, Park J.W., Park E. (2014), Australia</p>	<p>Nursing – 2nd year students</p>	<p>Improvements in mean scores of students perceived teamwork (team efficiency and team skills).</p>	<p>None-noted</p>	<p>Further investigation required to investigate actual impact of TBL on academic performance/ attainment</p>
<p>Whittaker, A.A. (2015)</p> <p>USA.</p>	<p>Undergraduate baccalaureate students (n=98 instructor-led; n-86 TBL)</p>	<p>Student engagement- higher levels of self-regulated online learning with TBL approach</p> <p>Student Attainment- significantly higher examination results with TBL approach</p>	<p>None reported</p>	<p>Homogeneity of the sample limits generalizability. Limitations identified with measure used. Further research required on the impact of each TBL component on self-regulated learning</p>