

MIXED-METHOD INVESTIGATION
OF PROBLEM-BASED LEARNING
AND TECHNICAL STUDENTS IN
GENERAL STUDIES COURSES AT A
MIDWEST TECHNICAL COLLEGE

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AGENDA

Purpose

- Topic Selection /Rationale
 - Traditional Learning format
 - Problem-Based Learning format

Literature Review

- Gap in Literature
 - Malcolm Knowles
 - Miller and Pfund
 - O'Conner

Methodology Mixed-Method

Duration

Analysis

- Focus Group
- Student Interviews
- Student Surveys

Conclusion

References

PURPOSE

Investigate the relationship between the problem-based learning (PBL) model, academic achievement, engagement and motivation, and self-directedness of technical students in general studies courses.

Additionally, the study compared the traditional learning model to PBL model.

DEPARTMENT CHAIRPERSON OBSERVATIONS

“Passive Education”

Minimal
Teacher/Student
Interaction
(Ground/Online)

Minimal Critical
Thinking Skills

Low
Self-Efficacy

Student Inability
to Conduct
Research

RATIONALE / TOPIC SELECTION

Retention of students in general education courses.

Unfavorable EOC student surveys.

Lack of Interest in general studies courses.

Students expressed minimal relevance to technical program.

Curriculum design to align with course level objectives.

Low summative assessment scores

Minimal student – teacher engagement

TRADITIONAL LEARNING

Classroom setting was instructor scripted, many times arranged with a primary flare (Qureshi & Ullah, 2014).

Desks were aligned mimicking K-12 seating charts limiting the doingness of students.

Classroom time is used for lecturing and assessing students' ability to memorize content (Aidinopoulou and Sampson, 2017).

Passive students in class, to memorize, repeat, and rely on notes given by the lecturers (Kadir et al., 2016).

Traditional Learning Background

- Historically, the passive absorption of information and teacher-directed activities were the traditional platform deemed acceptable for the educational system.
- This traditional method of instruction, **pedagogy** dated back as early as the seventh century according to Knowles, Holton, & Swanson (1998).
- During this era, monastic schools deemed this instructional model as the guiding light for the induction of young men into the priesthood.
- It was during this period this model of pedagogy symbolized the platform for formal education.

Four Pedagogical Assumptions

Pedagogical Assumption	Characteristics
Dependency on the leader (Teacher)	The learner was unable to learn because he or she did not know their learning ability.
Learning need must be subjected-centered	Leader provided information relative to subject-matter content only.
Only extrinsic motivation	Incentives and fear-based stimulus
Prior learning irrelevant	Teacher determine what information would be learned whether or not students had prior experience

Andragogy respected adult learners' prior knowledge by “moving from the teaching to the facilitation of learning” (Knowles, Holton, & Swanson, 2005, p. 58).

Problem-based learning creates the instructional platform open to collaborations of prior experiences, knowledge, and doingness to be incorporated in the instructional learning approach (Patel, 2011).

PROBLEM-B ASED LEARNING

Allows students the autonomy to learn by doing with the guidance of the facilitator.

Empowers the learner to raise questions, challenging facilitators on existing issues to the problem at hand, Yeo (2013).

It is this method of instruction that best met the career technical students' needs. Yeo (2013).

Embeds the elements of knowledge being construed by the interaction with the environment, learners being motivated by cognitive conflicts, knowledge being improved by discussion, and knowledge being constructed by learners, Gudduz et al. (2016).

Six Principles for Effective Learning

1. Participation is voluntary; adults engage in learning as a result of their own volition.
2. Effective practice is characterized by a respect among participants for each other's self-worth.
3. Facilitation is collaborative.
4. Praxis is placed at the heart of effective facilitation; "learners and facilitators are involved in a continual process of activity, reflection upon activity, collaborative analysis of activity, new activity, further reflection, and collaborative analysis, and so on"
5. Facilitation aims to foster in adults a spirit of critical reflection.
6. The aim of facilitation is the nurturing of self-directed, empowered adults.

(p. 6)

Element	Pedagogical approach	Andragogical approach
Preparing the learners for the program	Minimal	Provide information Prepare for participation Help develop realistic expectations Begin thinking about content
Setting the climate	Authority-oriented Formal Competitive	Relax, trusting Mutually respectful Informal, warm Collaborative, supportive Openness and authenticity Humanness
Involving learners in mutual planning	By Instructor	Mechanism for mutual planning by learners and facilitator
Diagnosing their own learning needs	By Instructor	By mutual assessment
Translating the learning needs into objectives	By Instructor	By mutual negotiation
Designing a pattern of learning experiences.	Logic of subject matter Content units	Sequenced by readiness Problem units
Helping adult learners manage and carry out their learning plans.	Transmittal techniques	Experiential technique (inquiry)
Evaluating the extent to which the learners have achieved their objectives	By instructor	Mutual re-diagnosis of needs Mutual measurement of program

LITERATURE REVIEW

Andragogy

Knowles (1984), “Adults may be totally *self-directing* in every other aspect of their lives, as workers, spouses, parents, citizens, leisure-time users, and the minute they walk into a situation labeled ‘education’ they hark back to their conditioning in school, role of dependency” (p. 9).

Knowles (1984) continued, “If adults are treated like children, this expectation conflicts with their much deeper psychological need to be *self-directed* and their energy is diverted away from learning to dealing with this internal conflict” (p. 9).

Career Technical Programs & Problem Based Learning

According to Handelsman, Miller, and Pfund (2007), active instructional approaches demonstrated to be *more engaging* for student producing greater academic achievement.

Chan (2016) stated problem-based learning gives students an opportunity to work in groups, to take responsibility for their own learning and to experience the feelings of accomplishment; and teachers facilitate rather than instruct. Unlike traditional teaching where teachers provide facts and assess students’ ability that relies on memorization, PBL encourages deep learning. (p. 26)

LITERATURE REVIEW CONTINUED

Engagement and Motivation

O’Conner (2018)

“As teachers, we understand the importance of *engaging our students*. Researchers agree that motivation to learn is one of the most important indicators of student success, regardless of age.

An interested student will give the learning task extra attention and is more likely to retain what he or she has learned. In short, an engaged student will learn more than a disengaged learner”. (p. 56)

Six Assumptions of Adult Learners

1. Concept of the learner- Adult learners need to know why they need to learn something new. Institutions must take this into account when designing curriculum
2. Role of the learner's experiences- Adult learners are responsible for their own decisions and learning. Faculty must consider creating class activities that will incorporate life experiences. This can be a valuable resource.
3. Readiness to learn, aligning learning with development- Adults learning needs must be addressed early in the learning continuum to ensure success of the learner.
4. Orientation to learning- Adult learners tend to be motivated to learn. Curriculum should be process based versus content based.
5. Motivation to learn- There is an intrinsic value for the adult learner as a personal payoff.
6. Adults need to know- Adult learners need to know why they need to learn something. This included all external and internal gains including negative implications for information not learned.

(Knowles, 1984, p. 9)

METHODOL OGY

The quantitative study led the researcher to analyze institutional *end-of-course survey results* to compare if changes to the instructional format reflected possible shifts in student perception and willingness to engage in general studies courses.

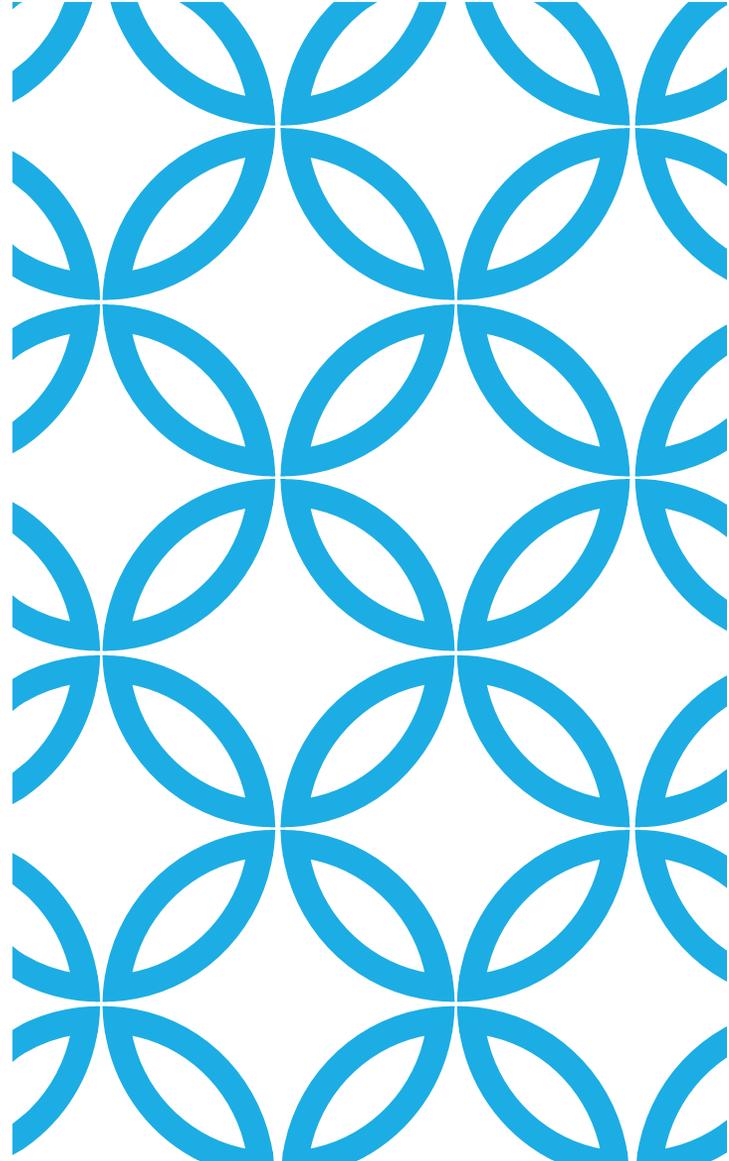
Additionally, *self-directed scale survey results* analyzed possible differences in instructional preferences noting changes in motivation and engagement , and self-directedness.

Finally, *assessment scores* were compared to reflect changes once problem-based learning model was introduced.

The qualitative facet of this study included *teacher observations*

Brought forth feedback from general studies' *facilitators* through a *focus group* regarding their prescribed pedagogical preference of instruction, methods for student engagement and motivations, and insight proportional to the problem-based learning curriculum.

Additionally, students feedback was collected through *student interviews*.



DURATION

RESEARCH – 1 ½ YEAR OF
SUMMATIVE ASSESSMENT
SCORES AND END OF
COURSE SURVEYS
TEACHER OBSERVATIONS

Null

Hypothesis

Null Hypothesis 1: There will be not be a difference in end-of-course evaluations and summative (final) assessment scores between the traditional learning model and PBL model.

Null Hypothesis 2: There will be not be a difference between self-directedness in the problem-based learning model vs. the traditional model.

Research Questions

Research Question 1: Which PBL activities helped students comprehend the subject content?

Research Question 2: What facilitation methods used by teachers align with the problem-based learning model and the traditional model?

Research Question 3: What are faculty's perceptions of the problem-based learning model in general education courses in a technical college in relationship to student motivation, academic achievement, engagement and self-directedness.

Research Question 4: What are students' perceptions of problem-based learning vs. traditional models?

RESULTS

Null Hypothesis 1

T-Test of two Independent Means was conducted to see differences.

- End of Course Surveys (A, B, C, D, E)
- Summative Assessment Scores

Null Hypothesis 2

- Self-directed Survey



RESULTS

Qualitative

RQ1. Which Problem Based Learning activities helped students comprehend the subject content?

Group Discussion and Forums

Group Projects and Research Assignments

RQ 2. What facilitation methods used by instructors align with the problem-based learning model and the traditional model?

Engagement

Technology use in Instructional Format



RESULTS

RQ 3. What are faculty's perception of the Problem-Based Learning model in general studies courses in a technical college in relationship to students, motivation, academic achievement, engagement and self-directedness?

Motivation

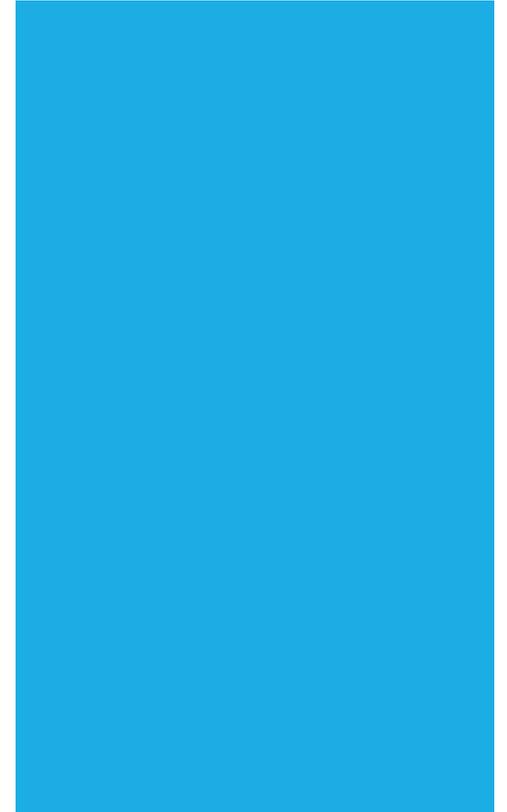
Group Projects

RQ 4. What are students' perceptions of problem-based learning vs. traditional models?

Student Interviews

Other Emerging Themes:

- Maturity level of students
- Use of technology
- Pedagogical conditioning
- Additional faculty task



Results Through Triangulation

Alternate Hypotheses 1: There will be a difference in end-of-course evaluations and summative (final) assessment scores between the traditional learning model and PBL model.

Research Question 2: What facilitation methods used by instructors align with the problem-based learning model and the traditional model?

Alternate Hypothesis 2: There will be a difference between self-directedness in the problem-based learning model as compared to the traditional learning model.

Research Question 4: What are students' perceptions of problem-based learning vs. traditional models?

Research Question 1: Which Problem-based learning activities help students comprehend the subject content?

Alternate Hypothesis 2: There will be a difference between self-directedness in the problem-based learning model as compared to the traditional learning model.

Research Question 3: What are faculty's perception of the Problem-Based Learning model in general studies courses in a technical college in relationship to students, motivation, academic achievement, engagement and self-directedness.

Limitations

- Student participation- Minimal
- Student email removed from LMS after one year
- Inconsistency in student survey questions- Survey questions changed
- Instructor movement

Recommendations

- Incorporating Andragogy as the learning model in post-secondary educational settings.
- Examine the inclusion of interactive learning environments, problem-based learning, and other methods of student engagement.
- Include more problem-based learning activities into general studies curriculum.
- Faculty must collaboratively create real-life activities or situational activities that blanket both technical and soft skills.

Conclusion

- Institutions of higher learning must put away traditional teacher-centered styles and methods of instruction and apply what works for the current 21st century student. As noted previously, there are many students that are still dependent on the guidance and direction of the instructor.
- Additional steps to integrate self-directedness through problem-based learning activities is required to assist students through this transitional period.