

# Using the TPACK model to Increase Digital Skills and Pedagogy in Graduate Nursing Education Students



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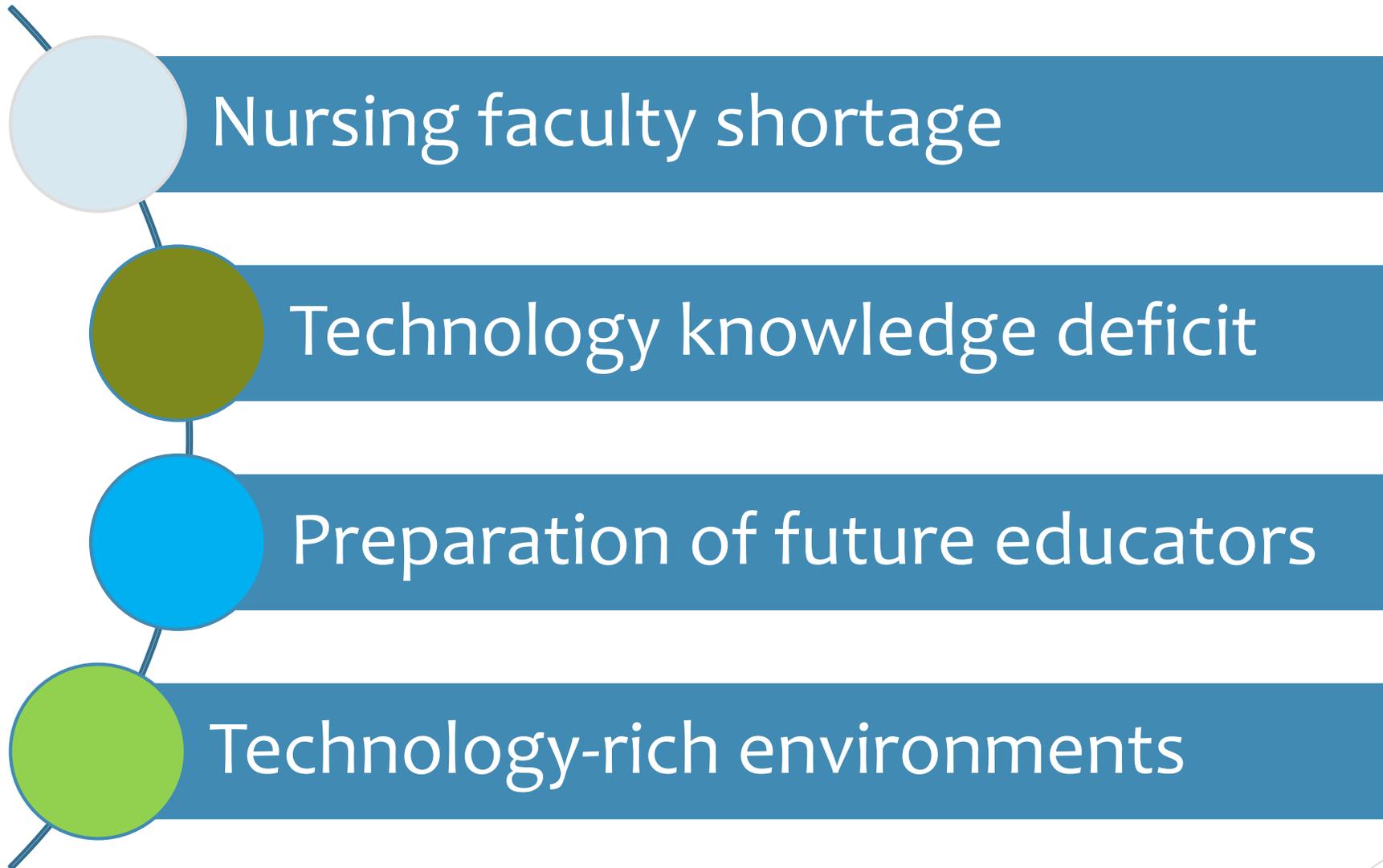
# Learner Outcomes

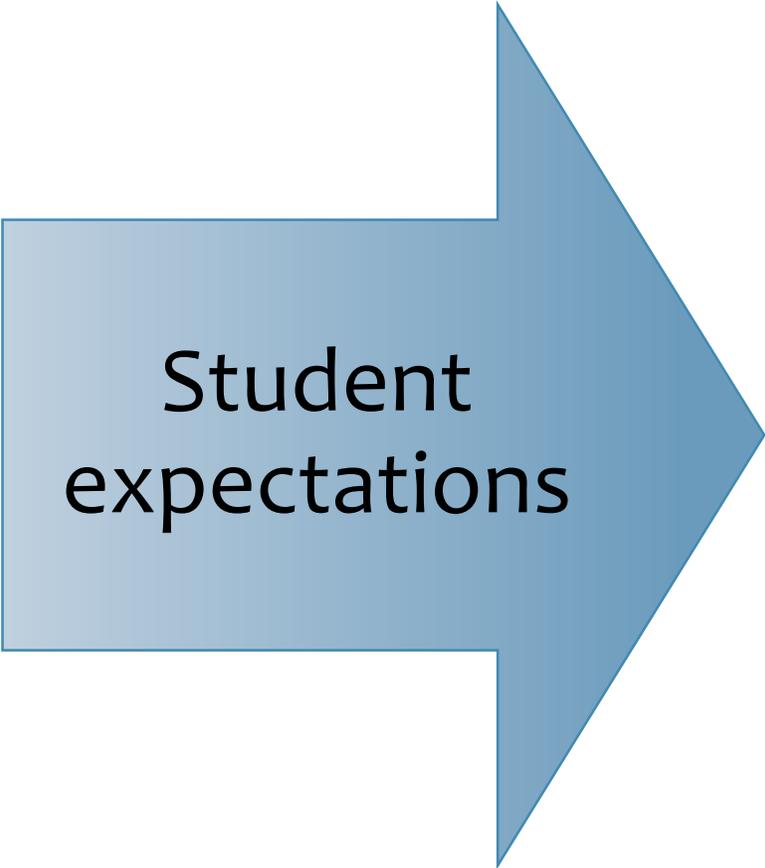
At the culmination of this presentation, the learner will:

- ▶ Relate the importance of technology-based pedagogy skills in nursing education
- ▶ Appraise the TPACK framework for application in nursing curricula

**DISCLAIMER:**

**There is no sponsorship or commercial support given to this author for this research study or presentation.**



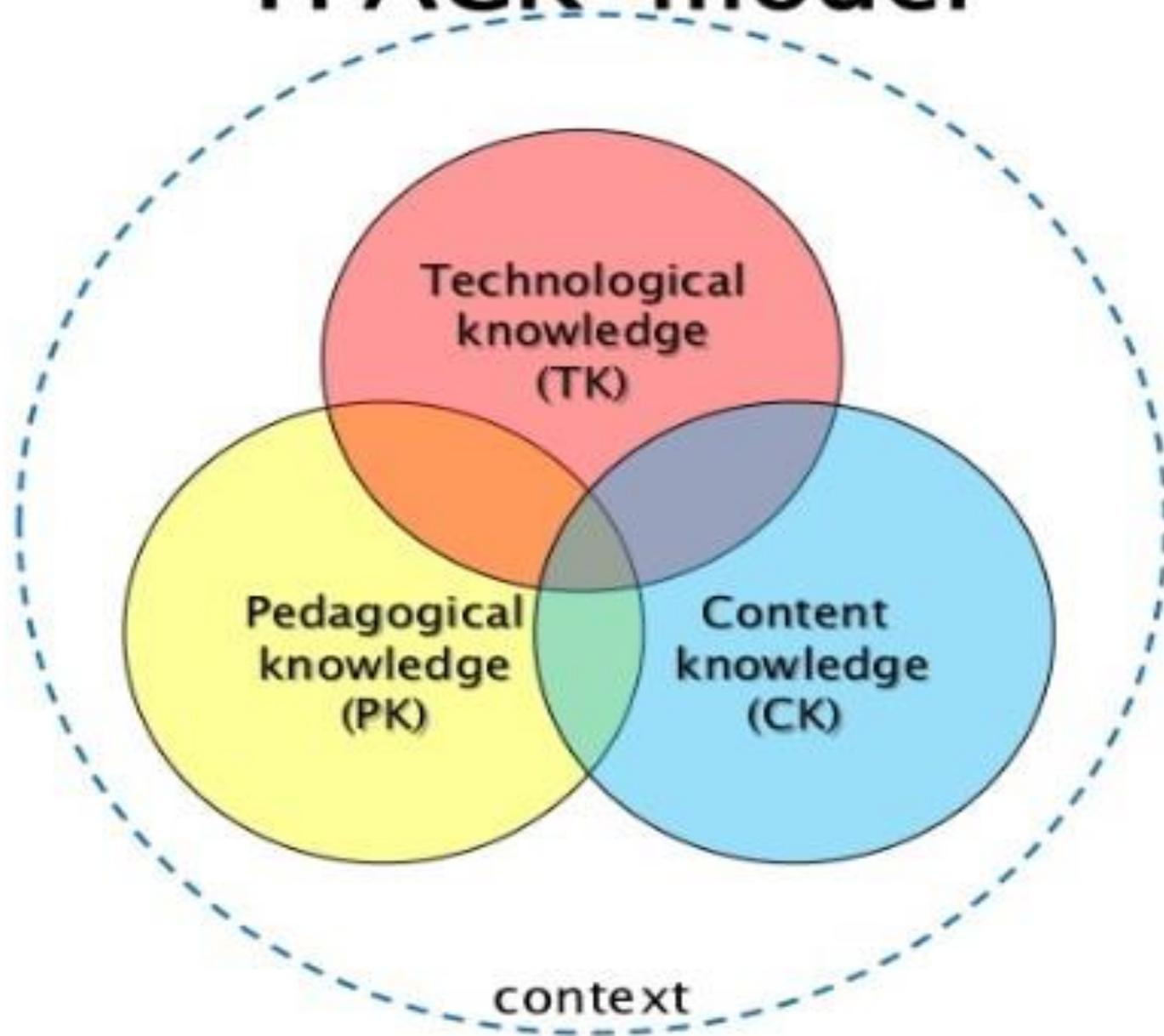


Student  
expectations



Faculty  
TPACK Skills

# TPACK-model



# Purpose

The purpose of this project was to increase technology-based pedagogical skills in graduate nursing education students through development and implementation of a non-credit bearing online training program, framed by the TPACK model.

# Hypothesis

Graduate nursing education students will increase technology-based pedagogical skills through completion of a multi-modular, non-credit bearing, online training course, based upon the TPACK model

# Methods

- ▶ A training course comprised of four online modules
- ▶ Developed by instructional designers & faculty
- ▶ Mixed methods, pretest-posttest design
- ▶ Instrument: TPACK-deep scale - measurement of technology-based pedagogical competencies

# TPACK-deep: Technological pedagogical knowledge scale

- ▶ 33-item scale measuring acquisition of preservice teacher's TPACK skills
- ▶ Likert scale
- ▶ Psychometrically stable

Design (10)

Exertion (10)

Ethics (5)

Proficiency (8)

# Faculty Pilot Preview

- ▶ Faculty enrolled (n=11); completed course (n=7)
- ▶ Feedback provided informally and through evaluations
- ▶ Applied to VLDD for graduate students

# Student Intervention

- ▶ Pre-survey + demographics
- ▶ Intervention: 4-week VLDD course, team taught
- ▶ Four week, asynchronous course
- ▶ Team taught
- ▶ Sample (n=23)
- ▶ Post-survey + course evaluation

# Weekly Modules for VLDD

- ▶ Managing Online Learning Communities
- ▶ Instructional Design Principles
- ▶ Effective Online Discussions
- ▶ Professional Virtual Lectures

# Learning Activities

- ▶ Softchalk Learning Objects
- ▶ Quizzes
- ▶ Weekly discussion forums
- ▶ Twitter
- ▶ Aggregated assignment
- ▶ Peer-to-peer feedback

# Sample Characteristics

## ▶ Age (in years):

Mean	42.7
Median	47
Std. Deviation	10.4
Minimum	25
Maximum	61

## ▶ Experience in online learning as a student:

	Frequency	Percent
Extensive experience	10	43.5
Quite a bit of experience	9	39.1
Some experience	4	17.4
Total	23	100

## ▶ Experience in online learning as an educator:

	Frequency	Percent
No experience	15	65.2
Quite a bit of experience	1	4.3
Some experience	4	17.4
Very little experience	3	13
Total	23	100

# Reliability Analyses of Scales

## Pre-test

Scale	Cronbach's Alpha	N items
Design	.951	10
Exertion	.909	10
Ethics	.901	5
Proficiency	.882	8

## Post-test

Scale	Cronbach's Alpha	N items
Design	.897	10
Exertion	.893	10
Ethics	.878	5
Proficiency	.915	8

# Pre- and Post-test Statistics

## ▶ Dependent groups t-tests: Composite Scale Scores

Scale	Pre-test		Post-test		Mean Difference	t(df=19)	Sig. level
	Mean	SD	Mean	SD			
<b>Design</b> (10 items summed responses, min 10, max 50)	30.00	9.34	46.70	3.50	16.55	7.723	.000
<b>Exertion</b> (10 items summed responses, min 10, max 50)	32.91	7.90	46.00	3.64	13.50	7.960	.000
<b>Ethics</b> (5 items summed responses, min 5, max 25)	20.61	4.22	24.15	1.53	3.55	3.397	.003
<b>Proficiency</b> (8 items summed responses, min 8, max 40)	29.91	5.38	36.50	3.58	6.65	5.806	.000

# Individual Items: Pre- and Post-test Statistics

## ► Dependent Groups t-tests: Design Scale

Item	Pre-test		Post-test		Mean Difference	t(df=19)	Sig. level
	Mean	SD	Mean	SD			
I can update an instructional material (paper based, electronic or multimedia materials etc.) based on the needs (students, environments, duration, etc.) by using technology.	3.35	1.229	4.55	.510	1.20	4.485	<.001*
I can use technology to determine students' needs related to a content area in the pre-teaching process.	3.00	1.243	4.50	.513	1.50	5.252	<.001*
I can use technology to develop activities based on student needs to enrich the teaching and learning process.	3.22	1.126	4.75	.444	1.55	5.820	<.001*
I can plan the teaching and learning process according to available technological resources.	3.26	1.214	4.80	.410	1.50	4.943	<.001*
I can conduct a needs analysis for technologies to be used in the teaching and learning process to increase the quality of teaching.	2.48	.898	4.40	.598	1.90	7.933	<.001*
I can optimize the duration of the lesson by using technologies (educational software, virtual labs, etc.)	2.83	1.267	4.80	.410	1.95	7.065	<.001*
I can develop appropriate assessment tools by using technology.	2.91	1.083	4.75	.444	1.80	6.493	<.001*
I can combine appropriate methods, techniques and technologies by evaluating their attributes in order to present the content effectively.	2.83	1.114	4.75	.444	1.90	6.785	<.001*
I can use technology to appropriately design materials to the needs for an effective teaching and learning process.	3.09	.949	4.70	.470	1.60	6.532	<.001*
I can organize the educational environment in an appropriate way to use technology.	3.04	1.022	4.70	.571	1.65	6.242	<.001*

(\*Significant at Bonferroni adjustment for multiple comparisons  $\alpha=.005$ )

# Individual Items: Pre- and Post-test Statistics

## ► Dependent Groups t-tests: Exertion Scale

Item	Pre-test		Post-test		Mean Difference	t(df=19)	Sig. level
	Mean	SD	Mean	SD			
I can implement effective classroom management in the teaching and learning process in which to technology is used.	2.78	1.126	4.60	.503	1.90	8.324	<.001*
I can assess whether students have the appropriate content knowledge by using technology.	3.04	1.065	4.40	.598	1.40	5.715	<.001*
I can apply instructional approaches and methods appropriate to individual differences with the help of technology.	2.70	1.185	4.55	.605	1.90	7.933	<.001*
I can use technology for implementing educational activities such as homework, projects, etc.	3.52	1.163	4.85	.366	1.40	5.085	<.001*
I can use technology based communication tools (blog, forum, chat, email, etc).	4.00	.739	4.80	.410	0.80	4.292	<.001*
I can use technology for evaluating students' achievement in related content areas.	3.13	1.180	4.60	.503	1.55	5.264	<.001*
I can guide students in the process of designing technology based products (presentations, games, films, and etc.)	3.30	1.063	4.45	.510	1.05	4.472	<.001*
I can use innovative technologies (Facebook, blogs, twitter, podcasting, etc.) to support the teaching and learning process.	3.48	1.039	4.60	.503	1.20	4.857	<.001*
I can provide each student equal access to technology.	3.22	1.085	4.40	.598	1.25	4.324	<.001*
I can provide guidance to students by meeting them to valid and reliable digital sources.	3.74	.915	4.75	.444	1.05	4.972	<.001*

(\*Significant at Bonferroni adjustment for multiple comparisons  $\alpha=.005$ )

# Individual Items: Pre- and Post-test Statistics

## ► Dependent Groups t-tests: Ethics Scale

Item	Pre-test		Post-test		Mean Difference	t(df=19)	Sig. level
	Mean	SD	Mean	SD			
I can be an appropriate model for the students in following codes of ethics for the use of technology in my teaching.	3.96	1.022	4.85	.366	0.90	3.596	.002*
I can behave ethically in acquiring and using special/private information	4.52	.665	4.90	.308	0.35	2.101	.049
I can use technology in every phase of the teaching and learning process by considering the copyright issues (e.g. license)	3.65	1.112	4.65	.489	1.00	3.823	.001*
I can follow the teaching profession's code of ethics in online educational environments (WebCT, Moodle, etc.)	4.09	1.083	4.85	.366	0.80	2.886	.009*
I can behave ethically regarding the appropriate use of technology in educational environments	4.39	1.033	4.90	.308	0.50	1.949	.066

# Individual Items: Pre- and Post-test Statistics

## ► Dependent Groups t-tests: Proficiency Scale

Item	Pre-test		Post-test		Mean Difference	t(df=19)	Sig. level
	Mean	SD	Mean	SD			
I can use technology to update my knowledge and skills in the area that I will teach	4.35	.647	4.85	.366	0.50	3.684	.002*
I can update my technological knowledge for the teaching process	4.00	.953	4.70	.470	0.75	3.470	.003*
I can use technology to keep my content knowledge updated	4.26	.864	4.75	.444	0.50	2.703	.014
I can troubleshoot problems that would be encountered with online educational environments (with CT, Moodle, etc.)	3.00	1.168	4.30	.657	1.25	4.467	<.001*
I can troubleshoot any kind of problem that may occur while using technology in any phase of the teaching	2.57	1.037	4.00	.795	1.45	6.175	<.001*
I can use technology to find solutions to problems (structuring, updating and relating the content to real life, etc.)	3.61	.722	4.60	.598	1.05	5.688	<.001*
I can become a leader in spreading the use of technological innovations in my future teaching community	4.04	.767	4.70	.470	0.65	3.577	.002*
I can cooperate with other disciplines regarding the use of technology to solve problems encountered in the process of presenting content	4.09	.996	4.60	.598	0.50	1.876	.076

(\* Significant at Bonferroni adjustment for multiple comparisons  $\alpha=.006$ )

# Qualitative Analysis

- ▶ Thorough content and outcomes
- ▶ Value of the knowledge to design and deliver a virtual course
- ▶ Insights into becoming an effective online educator
- ▶ Fun and substantive aspects of the course
- ▶ Ability to use the information in current roles

# Discussion

- ▶ Pre-test/ post-test 31/33 items demonstrating significant improvement of TPACK skills post-intervention

# What did you like?

- ▶ Course design/layout
- ▶ Virtual office
- ▶ E-book content
- ▶ Accessibility of resources
- ▶ Module lectures
- ▶ Interactivity within course
- ▶ Video tutorials
- ▶ Ideas for technology application

# What did you not like?

- ▶ Twitter
- ▶ Class size
- ▶ Intensity of pace
- ▶ Amount of content

# Limitations

- ▶ Small sample
- ▶ Varying levels of pre-existing knowledge and skills related to technology
- ▶ Progression in graduate curricula may vary among participants.

# Conclusions

- ▶ Improve preparation of digitally fluent nursing educators
- ▶ Can positively impact the technology skills of novice nursing faculty

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