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*Sincerely,*

***EJES, Team***

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# Competency-Based Education And Shared Academic Freedom For Transformational Education

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## Abstract

Curricular revision consistent with program mission and goals and that also fulfils accreditation requirements is essential for social work programs. In this article transformational education, shared academic freedom, and competency-based evaluation are described as central to effective preparation of students in social work education. The authors provide an overview of the transformational education literature and one school of social work's curricular revision process that demonstrates faculty-wide ownership of the revision process. The paper concludes with a discussion of how the faculty ownership and student evaluation process helped the school avoid the reductionist pitfalls in competency-based education in their pursuit of transformational education for programmatic impact.

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**Keywords:** competency-based education, shared academic freedom, transformation

## Introduction:

Transforming students into social workers who transform agencies, policies, communities, and sometimes the lives of clients is the lofty goal social work educators aspire to and the work to which they are committed. The profession joins the academy in this endeavor as social workers document the knowledge, skills, and values that are essential to their work and the academy designs curricula to prepare graduates to do the work. Professional education encompasses both the specificity of competencies of the profession and the critical thinking and broad learning of the academy.

This article provides an overview of a school of social work's curricular revision process devoted to transformational education, competency-based evaluation, and faculty-wide ownership of the revision

process, that is, shared academic freedom. Included is a description of the concept of transformational education and an examination of our school's competency-based evaluation process along with descriptions of assessment tools, reports, and resulting changes. The paper concludes with a discussion of how this process helped the school avoid the reductionist pitfalls in competency-based education in the pursuit of transformational education. The integration of these concepts is not only possible; it is essential.

### **One School's Journey:**

The School of Social Work (SSW) began with an undergraduate social work program more than 30 years ago and added an MSW program in the 1990s and a PhD program more recently. Since its inception, the School has been continuously accredited by the Council on Social Work Education (CSWE).

Multiple factors motivated the School's curriculum revisions. One was CSWE's shift in the focus of its Educational Policy and Accreditation Standards (EPAS) from essential content required for the education of social work professionals to professional competencies and practice behaviors operationalizing the competencies. The time was approaching for us to prepare a new self-study for reaffirmation of accreditation. This is part of a process that occurs every eight years for all social work programs during which they demonstrate that they meet current EPAS standards. Beyond adherence to the new standards for the explicit curriculum (courses) was a commitment to include our emphasis on the various ways faith is relevant to ethical social work practice. The ethical integration of faith in social work practice is central to our mission, and developing a curriculum congruent with it as well as our unique context of practice was essential. A final motivation was the challenge to remain competitive with several strong social work programs within 100 miles of our school and the emergence of online MSW programs nationwide.

### **University Context:**

Concurrent with our curricular revision process, the university was engaged in developing a new strategic plan with a focus on excellence in higher education, specifically referred to as transformational education. The guiding document for the strategic plan states that the university desires to be a place "where academic excellence and life-changing experiences ignite leadership potential that increases our students' desire for wisdom, understanding of calling, and preparation for service in a diverse and interconnected global society" (Pro Futuris, 2012).

Consistent with the mission of the university and the school, faculty members agreed on the importance of recognizing that students choose to

become social workers due to a sense of calling to respond to the needs of a hurting world. Their education includes both the course work (explicit curriculum) and their interactions with faculty, speakers, and the practice community (implicit curriculum); these are the vehicles for equipping them to respond to that call, making curricular change central to the accomplishing the mission of the school and the university. The faculty's role includes developing curricula that equip students with a professional identity and professional knowledge, values, and skills, as well as quantifying and measuring educational and professional practice outcomes.

### **Literature Review:**

The primary concepts driving curriculum revision in our school of social work were shared academic freedom, transformational education, and competency-based education, that is, the move from a content-based curriculum to one based in practice competencies. This literature review examines these three concepts.

### **Shared Academic Freedom:**

Academic freedom has been an important concept in higher education since the early 1900s coming from the German concept of *lehrfreiheit*, or the freedom of teachers (Champagne, 2011). Much that is written about academic freedom implies an adversarial position between faculty and administration in higher education. Academic freedom is discussed in terms of shared governance and the assumption that faculty must contend for their right to teach what they understand to be truth and for the discovery of knowledge (AAUP, 2008). The literature is almost silent in describing academic freedom as a shared or collaborative element in the university setting.

Poore (2009) discussed the institution's duty and right to hold faculty members accountable for engaging in professional development that would improve their ability to teach and produce positive student outcomes. The assumption is that the role and intent is adversarial rather than that faculty would be motivated to improve student outcomes. The author wondered if the "principles of academic freedom give the faculty total control over how they design and teach their courses" (p. 2). Champagne (2012) identified academic freedom as curriculum control including both course design and course content. This freedom is identified as an individual concept.

The national On-Campus Report (2005) included the importance of cooperation in academic freedom. The author discussed this in terms of requiring collaboration rather than assuming that faculty would be invested in and supportive of collaboration. Further, Champagne (2011) suggested

that assessment of learning outcomes is “an attack on academic freedom” (p. 9).

Within our School, a culture of collegiality and mutual support provided a foundation for our faculty’s adoption of the concept of *shared* academic freedom. This concept includes a belief that our integrated effort is stronger than simply adding courses together and that the curriculum is strongest when courses build on each other and when there is a coordinated inclusion of theory and practice models with common language both in the school and in the practicum community. We considered practice behaviors and textbooks and assignments that result in knowledge and skill growth and development in a coordinated effort. We coined a new term for this concept: shared academic freedom. We recognized our joint responsibility for a coherent curriculum that allows students to build knowledge and skill balanced with continued individual academic freedom in our courses. Full and part-time faculty members shared not only in making decisions about the curriculum but also in collaborating on course planning and delivery. This approach kept the mutual focus of both faculty members and administrators on curricular rather than control issues. In addition, our joint ownership of the process released creative energies that transcended any sense that we were merely acting out of obligation to adhere to the new accreditation standards.

### **Competency-based Education:**

The movement to competency-based education began in vocational education and training more than 40 years ago (Malone & Supri, 2012). These authors expressed concerns about the adoption of a competency-based curriculum in medical education. Important questions included: Is there a loss of overall competence by focusing on smaller units like practice behaviors? What is the impact on the content of the curriculum and the narrowing of focus? Reeves, Fox, and Hodges (2009) found that “the creation of competencies may also be regarded as an effort by professions to define certain activities that ‘belong’ to them” (p. 452).

Hodkinson (1992) discussed two models of competence, behavioristic and interactive, noting that professional schools in the Academy are sometimes drawn to skill acquisition. Hodkinson recommended that an interactive model of competence is more effective for developing thinking and conceptual learning. The interface of knowledge and understanding with practical professional skills provides a model for adapting competencies in a variety of contexts (Ashworth, 1992). The author noted that this higher-level thinking is difficult to assess and requires that competency-based assessment include attention to reliability and validity.

The importance of field education to social work education is a central factor in competency-based social work instruction. Field instructors and field agencies articulate what knowledge and skills are required for social workers in practice. Evaluating those in students is a significant opportunity and challenge. “While social work educators use a range of methods to assess student learning and program outcomes, a recurring theme is the difficulty of evaluating field learning” (Bogo, et al., 2006). Field instructors are increasingly involved in our curriculum meetings and other committee work to address their preparation for teaching and assessing our students. Classroom faculty and field instructors, whom we call field faculty, collaborate on defining and operationalizing practice behaviors in specific field contexts. Individual learning contracts are tailored to identify practice behaviors in agencies and student evaluation is based on the provision of evidence of practice behavior skill demonstration.

### **Transformational Education:**

Our private university has adopted transformational education as one of the centerpieces of its strategic vision. The standardization of education and outcomes does not address who and what is being transformed and to what end. Powell (2011) reminded faculty and administration that the best assessment of transformation or change as a result of education is not comparison with others or with an arbitrary standard, but with oneself and is longitudinal and understood over time. Helping students, faculty, and organizations identify who and what they aspire to be also provides the opportunity to document change and progress toward that end. This reinforces the importance of mission and of student calling.

Palmer (2014) reports that transformational education begins with transforming the institution into a place of respect rather than fear. “If we could reclaim the sacred – simple respect – in education, how would it transform our knowing, teaching, and learning? (Palmer, 2016, p. 6). Transformational education is the essence of our mission and of the calling of our students to serve the sacred and make a difference to individuals and the systems they live in. This perspective has motivated our school’s ongoing efforts to define the term *impact* and determine how to measure not only the impact of the program on students and alumni but also their impact on the communities where they work. Furthermore, faculty members are examining how to assess the impact of their research and service as well as their teaching. This multifaceted process has challenged our assumptions about what is of lasting significance and who needs to be involved in making this judgment and gauging how well it is being achieved.

### **The Caution of Virtue Ethics:**

Along with struggle to revise standards of excellence, the convergence and interface of competency-based education and transformational education presents the challenge of trying to maximize multiple values at the same time. In addition, the shift in social work to competency-based education, the enhanced role of field education as the signature pedagogy, and the business model of preparing students for the work environment raises the concern that we not replace robust education with training. Historically, social work is grounded in the liberal arts to ensure the development of critical thinking, understanding of systems, and commitment to social justice.

Chamiec-Case (2012) cautioned that the complexity of the profession of social work calls for social work educators to avoid marginalizing values and ethics by separating knowledge and skills from values and beliefs. The author expressed concern that memorized strategies and rote skills rather than critical thinking and professional judgment are not enough when engaging change in human lives. The author offered virtue ethics as a paradigm that includes character and virtue in professional development and professional behavior. The development of character and virtue is congruent with transformational education and minimizes the danger of focusing on competencies without commensurate attention to the art of becoming genuine and authentic helpers.

Moving beyond outcome-based education that is focused solely on competencies to an educational experience that is transformational requires a faculty fully engaged in making sense of these new concepts and how to apply them to our curriculum. To help us understand what transformational education means in our educational setting, we began to consider a series of questions:

- What transformation are students seeking?
- What transformation do we seek for them?
- What learning experiences will facilitate transformation?
- How will we know when and to what degree transformation has occurred?
- How will others know?

### **The Transformational Curricular Process:**

Before considering a list of competencies, the faculty participated in a daylong appreciative inquiry retreat (Cooperrider & Whitney, 2005) that focused on visioning the future of social work education in our school. The theme of the retreat was expressed in our unofficial motto of wanting the education of our students to be REAL: Reflective, Experiential, Authentic

Learning. The values embedded in this acronym continue to shape our process of curricular innovation toward transformation.

The REAL acronym captured the commitment of the faculty to curricular revision that would include transformation for faculty as well as for students. The “R” in REAL emphasized education characterized by self-awareness, critical thinking, and collegial and collaborative work. The importance of the practice components of the curriculum and the centrality of the field internship program were expressed with “E” for Experiential learning. This focus on field education and the importance of student demonstration of competencies with actual clients and projects set our program on a course congruent with the profession’s concept of field education as the signature pedagogy. Further, the MSW program curriculum included experiential learning in research through the completion of a practice-based research project during the final year of the MSW curriculum.

The “A” in REAL refers to the centrality of Authenticity throughout the educational process. This quality is manifested in relationships of mutual respect, valuing listening more than advocacy, engaging those we serve in crafting solutions, and debating questions that matter. The result is a healthy community that is connected to the mission and goals of our university and school, the unique calling and gifting of our students and faculty, and the needs and resources in the communities in which we and our students work. Finally, curricular change grounded in being intentionally reflective, experiential, and authentic created a dynamic environment of Learning, the “L”, that concentrates not only on monitoring processes and measuring outcomes but also on assessing learning, growth, and impact over time.

Our school made program revisions based on our REAL Retreat and integrated our changes with the stated goal of the competency-based EPAS, addressing academic excellence through the lens of professional competence. The result is a curriculum that exemplifies the co-inherence of 1) EPAS Core Competencies and Practice Behaviors; 2) the school’s own mission, goals, objectives, and themes of community building, strengths perspective and the ethical integration of faith and practice; 3) explicit generalist and advanced curricula; and 4) an implicit curriculum that emphasizes our university’s religious and regional context. We created an evaluation system for our generalist and advanced educational outcomes that included both rubrics to assess the attainment of practice behaviors in classroom and field courses, and surveys for students to assess their self-efficacy with respect to the practice behaviors.

Curricular revision for transformational education required investment and ownership by the entire faculty rather than a representative sample on a curriculum committee. The entire faculty decided to meet weekly as a curriculum committee to assure curricular integration and

synthesis. During two years of operating as a curriculum committee of the whole, our understanding of academic freedom expanded to include a shared or communal component as well as the traditional individual elements. Together we designed the overall curricular structure for the BSW and MSW program; identified course goals and objectives; made decisions about core courses, groupings of courses, and the three concentrations related to advanced practice in the MSW program; built the scaffolding of educational competencies that linked one course to the next; and addressed field education opportunities and challenges.

An additional benefit from collaborative decision making was the clear alignment of program mission, goals and objectives with individual course objectives and across vertical and horizontal intersections in the curriculum. Vertical intersections included those course sequences that build on one another across time, e.g. Practice I to Practice II to Practice III. Another example is the multi-year research sequence that includes statistics, research, and the research project. Horizontal intersections included courses that were taken in tandem with one another in the same semester, such as Human Behavior and the Social Environment I and Practice I.

### **Alignment toward Transformational Education:**

Although we adopted the competencies and practice behaviors of the accrediting agency, we also added an additional competency and related practice behaviors specific to a core theme of our school: the ethical integration of faith and practice. This competency was integrated, along with the others, into major content areas including human behavior, values and ethics, diversity, practice, policy, and field education. For example, in field education we considered contexts of practice for the ethical integration of faith and practice to include congregations and religiously affiliated organizations where students could demonstrate all of the educational competencies and related practice behaviors. Bringing social work students and experienced field instructors into these contexts was not only transformative for the students but for the practice settings and their communities as well (Harris, Yancey & Myers, 2016).

### **Accountability:**

The complex curriculum required an intricate method to track student learning. We first created a master planning spreadsheet for each program showing the alignment of program goals, course objectives, and competencies. After examining each course's content, readings, speakers, and assignments, faculty members decided where to place the individual practice behaviors and how to assess them. Such detailed alignments are

essential for a coherent evaluation of student learning in which students must demonstrate their mastery of the competencies and practice behaviors.

The next step was the development of rubrics designed to evaluate the program by assessing student competence through their demonstration of the practice behaviors. Faculty members designed a rubric for each assignment that measures practice behaviors. For our purposes rubrics are the tools we use to communicate more clearly to students and to ourselves as faculty members expectations about the essential learning in each assignment, and to provide feedback to students about how well they are learning and how well we as professors are teaching. Faculty must make complex judgments when assessing student demonstration of competence in assignments. These rubrics are constructed and designed to provide a grounded basis for those judgments.

Currently instructors use the rubrics to assess only the practice behaviors related to the assignment. We continue to explore how to use them to grade assignments, because grading includes elements beyond the scope of the practice behaviors, such as additional content, writing skills, and the use of APA style.

The example in Figure 1 is a rubric for a portfolio assignment in the BSW Senior Capstone course.

Figure 1. Rubric for BSW Capstone Research Assignment.

School of Social Work					
Individual Grading Rubric					
SWO 4293 – Senior Capstone Seminar					
Student:					
Capstone Rubric					
Practice Behaviors and Other Criteria	1-Inadequate	2-Novice	3-Competent	4-Proficient	5-Excellent
	Doesn't demonstrate it	Demonstrates it somewhat	Demonstrates it okay	Demonstrates it well	Demonstrates it very well
	<80	80-82	83-86	87-89	90-100
6.1 Use practice <b>experience</b> to inform scientific inquiry					
6.2 Use research <b>evidence</b> to inform practice.					

It measures the two practice behaviors in the EPAS research competency, which are to engage in research-informed practice and practice-informed research. The 5-point scale goes from 1 “Inadequate – does not demonstrate competence” to “2-Novice”, “3-Competent”, “4-Proficient”, and finally to “5-Excellent – demonstrates commendable competency.” The 100% grading scale has been apportioned to correspond to the 5-point competency scale. Anything below 80% (grade of B-) is considered inadequate from a competency standpoint. An A- (90%) is considered excellent in this rubric. When grading an assignment, professors can place an X in a cell based on the actual grade the student has earned for a particular practice behavior, or they can refer to the 5-point scale and place an “X” in a cell based on a student’s grade and their professional judgment about the student’s competence.

The rubrics, completed at the end of each semester, are compiled and analyzed with findings made available in Course and Program-level Outcome Reports. Figure 2 is a facsimile of a Course Outcome Report for a rubric that measured the competency related to research. The competency has two practice behaviors, and for this course the report shows the number of students (27), the average score for each practice behavior (4.04, 3.96), and the distribution of scores across the five-point scale (count and percent).

Figure 2. Course Outcome Report

Performance by Standards Report									
Report:									
Report Generated by TaskStream									
DFR Template(s):		BSW Spring 2012							
Program(s):		BSW Spring 2012							
# Authors		132 Authors matched search criteria							
Report Generated:		Sunday, September 30, 2012							
Competency 6. Engage in research-informed practice and practice –informed research									
Rubric Criteria	Authors Evaluated	Results for Group	Distribution of Scores						
G6.1 Use practice experience to inform scientific inquiry	27 of 132 (20.45%)	Ave. = 4.04/5 (80.8%)	Score	1	2	3	4	5	
			Count/ %	0	0	1	6	11	37.0 4%
G6.2 Use research	27 of 132	Ave. = 3.96/5	Score	1	2	3	4	5	



perceive themselves as competent as their professors do? That is an issue faculty and students have begun to discuss.

Table 1 also displays the scores for six practice behaviors – two each for the research, human behavior, and policy competencies. At this more detailed level we see again that students perceive themselves as less competent than their professors do with one notable exception. For research practice behavior “G6.2 - Use research evidence to inform practice”, the field seminar professors rated the students 3.0, barely competent (almost at the novice level). The concern is that students demonstrated in their Capstone portfolio that they can appropriately integrate research and practice, but they may not be using evidence-informed practices in their actual work in the field. A possible explanation for this discrepancy is that students selected for their portfolios examples from papers in courses where there was research related to practice, but in their internship the situations they had to address were ones without research evidence to guide their practice or existing evidence was overlooked.

Examining learning at the level of practice behaviors and from multiple perspectives has provided us with a nuanced view of outcomes and highlighted issues we could not have identified otherwise. Concerns like the two mentioned above are being examined by our faculty, field supervisors, and students. In addition, our faculty is striving to improve inter-rater reliability when assessing the competencies and also examining the measures we use to help ensure their validity.

### **Connecting Evaluation to Transformation:**

These evaluation results facilitated conversation about how social work research, including the use of evidence-based practices and the evaluation of practice, can be implemented more systematically within practice settings and in a wider range of settings. Focusing attention on best practices and evaluating practice results can be transformational for both student interns and staff. The next logical and challenging step is to assess transformation in those who receive the services provided by students and agencies.

### **Implications:**

Faculty members engaging with each other in an atmosphere shared academic freedom are able to pursue transformational education that contributes to achieving competence as well as to measuring and improving outputs in academic programs and affiliated agencies. This focus on competency-based education is enriched by shared academic freedom with the intent to produce a coordinated curriculum for student transformation. We are beginning conversations about how this pursuit will help us

understand the impact of our program to transform graduates and communities as well.

### **Shared Academic Freedom:**

The curricular development and enrichment process is the responsibility of the entire faculty whose ownership and participation make substantive and sustainable change possible. The process we undertook was stimulated by but not primarily in response to the external demands of accreditation. It was motivated by a desire for proactive innovation consistent with our mission and goals and with internal program accountability for transformation. As we shared responsibility for the curriculum, we shared in the assessment and celebration of transformation. The vehicle for curricular enrichment and innovation was the combination of shared academic freedom and a competency-based educational model. The approach included commitment to both explicit and implicit curricular change rooted in a collaborative overhaul of the curricula and an intentional evaluation of students' practice behaviors in the classroom and in the field. It also included the students' self-assessment of their competence. The results? Students report the transformation of their own practice skills and intentional professional identity; agencies report the transformation of services offered in their settings as students bring cutting edge practices to the facilities; and faculty report an infusion of energy and a clarity of purpose in teaching a curriculum that is designed to produce and measure growth and change. Student course evaluations and field performance supported these reports of transformation. Further, faculty and administrators reported increased collegiality with their joint focus on curricular change and student outcomes. These results indicate transformation instead of the pitfall of simply focusing on competency scores.

### **Limitations:**

One significant limitation is that our evaluation method that does not measure change in agencies and in their service populations. Faculty and students on the curriculum and the evaluation and accreditation committees are responsible for defining impact and monitoring the impact of our educational programs. It will be important to include agency constituencies in that committee work. Another limitation is that the evaluation system is designed to examine program-level outcomes only. It is not designed to track the development of the competence of individual students as they progress through the program. We are striving to improve both inter-rater reliability and the validity of our measures before directing our attention to the level of tracking individual student progress in the program.

### **The Goal of Transformational Education—Impact:**

The profession's move from evaluating educational programs by their input of content to their outcomes of competence in practice behaviors was a major paradigm shift. Viewing this shift in light of transformational education pushes the boundaries even further by raising the critical issue of the impact of what students learn. Therefore, in addition to including content on character and virtue and focusing on behavioral outcomes, we have also begun to expand the core question for our program evaluation from "What are the average practice behavior scores of our students?" to "What difference does our social work education make in the life of a student helper?" What difference does it make to have social work students and supervising faculty in agencies, including congregations and RAOs? What is the impact of social work provided by students on the lives of those served by those agencies? Furthermore, we are asking: "What differences are social work faculty members making in society's understanding of the human condition, the challenges of injustice, the changes in technology and education delivery, and international education? Where are our graduates making a difference in the lives of others both locally and globally? What is being transformed inside us and around us, and to what end?" These are the questions that will lead us to understanding the impact of our program. We are at the beginning of the process informed by our shared academic freedom and our commitment to professional competence.

### **Conclusion:**

Social work education, which prepares students to be change agents, finds itself in the position of being a change agent for transformation in higher education and, beyond that, in the communities in which we serve. We assert that our development of shared academic freedom in a curricular change process focused on competency-based education is the path to transformation in students and graduates. While accrediting processes matter, they are not the driving motivation for curricular change. The opportunity to collaborate together for transformation for our students and graduates resulted in transformation in the faculty as well.

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# Improving Student's Critical Thinking Through Technology At Historically Black Institutions

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## Abstract

This study examines the differences in student's critical thinking ability through the Watson-Glaser Online Assessment software in a pretest-posttest setting. There is a noticeable increase in the categories of Recognize Assumptions and Evaluate Arguments and a relatively large decrease in the category of Draw Conclusions. In general, students from Non-STEM majors benefits more from teaching with technology than those in STEM majors.

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**Keywords:** Watson Glaser Online Assessment, Critical Thinking, Recognize Assumption, Evaluate Argument, Draw Conclusion

## Introduction

Critical thinking is one of the ultimate goals in education with most valued outcomes. Critical thinking has many definitions. John Dewey (Dewey, 1910) is among the first few educational leaders who proposed that a curriculum with integrated thinking skills would benefit both the students and the entire learning community. McPeck (McPeck, 1982) recognized that certain aspects of problem solving requires critical thinking which can be treated as a skepticism about a subject or field. According to Beyer (1995), critical thinking means making clear, reasoned judgements. During the process of critical thinking, ideas should be reasoned and well thought out/judged. Critical thinking is the ability to integrate many different ideas to come up with a unique solution to solve a real life problems. In mathematics, critical thinking can be either an analysis or a synthesis. In algebra, one needs to break the work into several parts or steps to solve it, while geometry requires one to combine several elements or formulas together to solve the problem. While Reichenbach (Reichenbach, 2000) defines critical thinking

as a process of interpreting, analyzing, evaluating, and synthesizing information to form a good understanding, judgement, or solution. Simply acquisition of skills are not enough to meet with the demands in the development of our society and it requires us to think critically and solve a variety of complicated problems. Dewey (Dewey, 1910) states that "if we teach today as we taught yesterday, we rob our children of tomorrow". Many technological tools are constructed to better integrate the teaching techniques in today's classrooms and prepare our students to be critical thinkers in the future.

Once students are able to think critically, they will consider the criteria to make thoughtful decisions or judgments about what to do (Paul, 2012). That is to say, students will not simply guess for the correct answer or apply a formula without thinking its relevance. For instance, rather than directing students to solve an assigned problem step by step with a fixed strategy, the teacher works with them to choose the most appropriate strategy based on the criteria suitable for solving the problems. Students in STEM disciplines (Allen, 1981) often experience difficulties as a result of their inability to see that multiple interpretations of the same data can coexist. Understanding the different stages of thinking will help instructors in these fields to choose the most appropriate way of presenting the course content so that students can make the transition from one stage of thinking to the next smoothly. The instructors should distinguish between an idea and the name of that idea, between facts and conjectures, and be aware of student's thinking process. Aarons (Aarons, 1985) especially discussed why one should care about critical thinking, especially among American students, and how to increase or decrease student's critical thinking ability.

However, technology (Brouwer, 1996) is widely used as a means of improving the quality of teaching and learning. Moll and Allenn (Moll and Allen, 1982) uses video and discussion in class to enable students to derive concepts from the collected data, apply concepts in real life examples and practice scientific processes in a biology class at West Virginia University. They used a pretest/posttest to measure the difference in students' critical thinking skills pretest/posttest. The Reason! Project (Gebler, 2001) at the University of Melbourne has developed the Reason!Able software as part of a general method aimed at enhancing critical thinking skills. They found a consensus around the unsurprising idea that critical thinking skills improve with practice by integrating technology in teaching. Students using Reason!Able appear to make dramatic gains.

The Reason! Project (Gebler, 2001) at the University of Melbourne has developed the Reason!Able software as part of a general method aimed at enhancing critical thinking skills. Rather than tinkering with existing methods, they are building afresh from solid foundations in cognitive

science. They found a consensus around the unsurprising idea that cognitive skills, like other skills, improve with practice which should be motivated, guided, scaffolded, graduated and providing feedback. Students using Reason!Able appear to make dramatic gains.

This project is to examine the theoretical foundations of critical thinking in higher education and how they can be applied to new opportunities through the use of technology. The Elizabeth City State University-Minority Science and Engineering Improvement Program (ECSU-MSEIP) project addresses the growing shortage of qualified and competent STEM majors by strengthening course curricula through the infusion of critical thinking through technology (CTTT). The MSEIP Project recruited 17 faculty members from a total of ten institutions, consisting of seven Historically Black Colleges and Universities/Minority Institutions, one community college, one women's college, and one tribal college for faculty development and training in the use of "Critical Thinking through Technology" (CTTT) strategies in teaching STEM courses. The majority of students from these institutions come from socially, economically, culturally and academically disadvantaged backgrounds, and qualify for the Pell Grant and other financial assistance. Underrepresented minorities represent only a minute fraction of the population of qualified scientists and engineers in STEM disciplines in the United States.

Thus, the STEM Programs in these institutions provided a national advantage by integrating technology in classroom to potential STEM majors. The ultimate goal of this project was to address the growing shortage of qualified and competent STEM majors by strengthening course curricula through the infusion of critical thinking through technology.

### 1. Methodology

*Design.* This project used a pretest and posttest of the critical thinking test from the Watson-Glaser Online Assessment to measure the difference of student's critical thinking ability. The Watson-Glaser™ Critical Thinking Appraisal is the most widely used tool for selecting great managers and developing future leaders. Developed in 1925, the Watson-Glaser has been the premier tool for evaluating the cognitive ability of professionals. The Critical Thinking Test is a quick 40-item, multiple test with many reporting options. It is divided into three categories: Recognize Assumptions (12 questions), Evaluate Arguments (12 questions), and Draw Conclusions (16 questions) that assess student's critical thinking ability in the developmental mathematics courses.

*Data Analysis.* The following sections summarize the results of the Pretest and Posttests towards critical thinking that were administered to college students at the beginning and the end of Spring 2014. The

participating institutions include Albemarle College, Bennett College, Bluefield State College, Elizabeth City State University, Hampton University, Shaw University, Lincoln University, West Virginia State University, and Virginia Union University. The targeted courses in this project include Mathematics, Physics, Biology and Computer Science. Of all student participants, 387 students had valid critical thinking pretest scores, and 254 students completed the posttest.

**Section 2.1: Comparison of overall Performance of students on Critical Thinking Pretest and Posttest**

Across all students taking the Pretest and Posttest, the number of correct answers had a fairly normal distribution (see Figure 1). The lowest score of the pretest was 0 (3 students) and the highest score was 35 (1 student), while the posttest had the lowest score of 6 (2 students) and the highest score of 38 (1 student). In the posttest, the percent of students who got 6 to 10 correct answers was extremely low (0.6%) compared with the pretest. Approximately 16% of students scored 26 or better in the posttest and only 11% did in the pretest. Although there is no noticeable difference between pretest mean and posttest mean, but the distribution of the posttest did change from a fairly normal distribution to approximately right-skewed distribution. It showed that the majority of student did benefit from the teaching with technology. In general, as shown in Table 1, students performed slightly better in the category of Evaluate Arguments than the other two categories: Recognize Assumptions and Draw Conclusions.

Figure 1. Distribution of the Pretest and Posttest scores for all students.

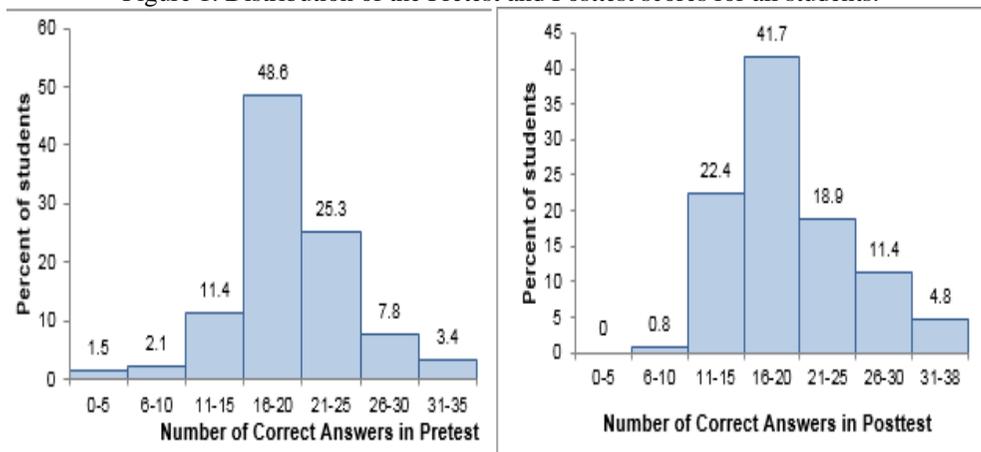


Table 1: Five number summary of the Critical Thinking Pretest

Five-Number Summary of total correct Answers (40)					Mean	Standard deviation
Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum		
0	17	19	22	35	19.553 (48.9%)	5.17
Five-Number Summary of Recognize Assumptions (RA) (12)					Mean	Standard deviation
Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum		
0	4	5	7	12	5.45 (45.4%)	2.62
Five-Number Summary of Evaluate Arguments (EA) (12)					Mean	Standard deviation
Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum		
0	5	7	8	11	6.55 (54.6%)	1.96
Five-Number Summary of Draw Conclusions (DC) (16)					Mean	Standard deviation
Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum		
0	6	7	9	16	7.55 (47.2%)	2.71

Table 2: Five number summary of the Critical Thinking Posttest

Five-Number Summary of Posttest (40)					Mean	Standard deviation
Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum		
0	16	19	22	38	19.681 (49.2%)	5.25
Five-Number Summary of Recognize Assumptions (12)					Mean	Standard deviation
Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum		
1	4	6	8	12	5.945 (49.5%)	2.66
Five-Number Summary of Evaluate Arguments (12)					Mean	Standard deviation
Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum		
1	6	8	9	12	7.72 (64.3%)	2.26
Five-Number Summary of Draw Conclusions (16)					Mean	Standard deviation
Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum		
1	4	6	7	15	6.02 (37.6%)	2.42

*Comparison of Pretest and Posttest.* Table 1 shows that the mean of total correct answers in the posttest is slightly higher than that of the pretest. Comparing the Pretest and Posttest of each category, there is a 4.1% and 9.7% increase in the categories of Recognize Assumptions and Evaluate Arguments and a 9.6% decrease in the category of Draw Conclusion. In the five number summary of categories: Recognize Assumption and Evaluate Argument, students typically got one more correct answers in the posttest than the pretest. However, students in general missed two more questions in the category of Draw Conclusions.

*Discussion.* Overall, there is no noticeable difference between the total number of correct answers in Pretest and Posttests. However, there is a large increase in the category if Evaluate Argument and relatively small increase in Recognize Assumption. However, a huge decrease occurs in the category of Draw Conclusion comparing the Posttest with the Pretest. Integrating technology in teaching helped students to recognize assumptions and evaluate arguments. As shown in literatures (Brouwer, 1996; Moll and Allen, 1982; Gebler, 2001), using technology improved student's ability in deriving and applying concepts as well as practicing scientific processes, which were in the category of recognizing assumptions and evaluating arguments. However, no research showed an effective way to increase student's ability in drawing conclusions.

## Section 2.2: Comparison of STEM and Non-STEM Majors in Pretests and Posttests

*Comparison of Pretest Scores and Posttest Scores for STEM and Non-STEM Majors.* In table 3, STEM<sup>1</sup> represents pretest for STEM majors and NonSTEM<sup>1</sup> stands for pretest of Non -STEM majors. STEM<sup>2</sup> and NonSTEM<sup>2</sup> are posttests for STEM and Non-STEM majors respectively. In general, students from Science, Technology, Engineering, and Mathematics (STEM) did slightly better than students in Non-STEM disciplines in both Pretest and Posttest. This is reasonable because students in STEM majors are typically more knowledgeable with technology software than Non-STEM students. For all disciplines, there are noticeably increase in both the categories of Recognize Assumptions and Evaluate Arguments, but a relatively large decrease in the category of Draw Conclusions. Comparing the pretest mean and posttest mean, STEM majors has a slight decrease while Non-STEM majors has a slight increase. Looking at the five number summary of the pretest and posttest, STEM majors averagely got one more correct answer than Non-STEM majors for class median and 3 more correct answers for the third Quartile.

Table 3: Summary of Pretests and Posttests for STEM and Non-STEM Majors.

Five-Number Summary of Total Pretest-Posttest (40)					Mean	Standard deviation
Min	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Max		
STEM <sup>1</sup> 10	17.75	20	24	35	20.98 (52.45%)	4.98
Non-STEM <sup>1</sup> 0	17	19	21	32	18.75 (46.88%)	5.32
STEM <sup>2</sup> 11	16	20	24.5	38	20.61 (51.53%)	5.81
Non-STEM <sup>2</sup> 9	16	19	21	37	19.05 (47.63%)	4.83

<b>Five-Number Summary of RA-Pretest –Posttest (12)</b>						<b>Mean</b>	<b>Standard deviation</b>
<b>Min</b>	<b>1<sup>st</sup> Quartile</b>	<b>Median</b>	<b>3<sup>rd</sup> Quartile</b>	<b>Max</b>			
STEM <sup>1</sup> 0	3	5	8	12	5.52 (46%)	2.84	
Non-STEM <sup>1</sup> 0	4	5	7	12	5.32 (44.33%)	2.54	
STEM <sup>2</sup> 1	4	6	9	12	6.32 (52.67%)	2.82	
NonSTEM <sup>2</sup> 1	4	5	7.5	11	5.72 (47.67%)	2.55	

<b>Five-Number Summary of EA-Pretest-Posttest (12)</b>						<b>Mean</b>	<b>Standard deviation</b>
<b>Min</b>	<b>1<sup>st</sup> Quartile</b>	<b>Median</b>	<b>3<sup>rd</sup> Quartile</b>	<b>Max</b>			
STEM <sup>1</sup> 2	6	7	8	11	7.09 (59.08%)	1.72	
Non-STEM <sup>1</sup> 0	5	6	8	11	6.24 (52%)	2.02	
STEM <sup>2</sup> 1	6	8	10	12	8.02 (66.83%)	2.34	
NonSTEM <sup>2</sup> 1	6	7	9	12	7.50 (62.5%)	2.26	

<b>Five-Number Summary of DC-Pretest-Posttest (16)</b>						<b>Mean</b>	<b>Standard deviation</b>
<b>Min</b>	<b>1<sup>st</sup> Quartile</b>	<b>Median</b>	<b>3<sup>rd</sup> Quartile</b>	<b>Max</b>			
STEM <sup>1</sup> 2	6	8	10	16	8.375 (52.34%)	2.72	
Non-STEM <sup>1</sup> 0	5	7	9	14	7.19 (44.94%)	2.6	
STEM <sup>2</sup> 1	6	8	10	12	6.26 (39.13%)	2.65	
NonSTEM <sup>2</sup> 1	4	6	7	15	5.83 (36.44%)	2.24	

### Section 2.3: Comparison of 1-2 Year College Students and 3-4 Year College Students

This section displays the five number summary, class mean, class standard deviation and number of students of pretest and posttest for Year 1-2 students and Year 3-4 students respectively. It also shows the differences of pretest mean and posttest mean in each category of the test (see Table 4 and 5).

Table 4: Summary of Pretest and Posttest for 1-2 Year 3-4 Year College Students.

Name	Five-Number Summary-Total					Mean	Standard deviation	N
	Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum			
Pre-1,2	0	17	19	23	35	19.45	5.66	246
Pos-1,2	9	16	19	22	38	20.09	5.60	149
Pre-3,4	12	18	20	22	32	20.16	3.48	141
Pos-3,4	10	15	19	22	33	19.10	4.66	105
Name	Five-Number Summary-RA					Mean	Standard deviation	N
	Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum			
Pre-1,2	0	4	5	7	12	5.52	2.69	246
Pos-1,2	1	4	6	8	12	6.29	2.64	149
Pre-3,4	0	4	5	7	12	5.15	2.50	141
Pos-3,4	1	3	5	8	11	5.46	2.62	105
Name	Five-Number Summary-EA					Mean	Standard deviation	N
	Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum			
Pre-1,2	0	5	7	8	11	6.38	2.01	246
Pos-1,2	3	6	7	10	12	7.66	2.29	149
Pre-3,4	2	6	7	9	10	6.92	1.88	141
Pos-3,4	1	6	8	9	12	7.79	2.22	105
Name	Five-Number Summary-DC					Mean	Standard deviation	N
	Minimum	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Maximum			
Pre-1,2	0	6	7	9	16	7.54	2.85	246
Pos-1,2	1	4	6	8	15	6.14	2.58	149
Pre-3,4	3	7	8	10	13	8.10	1.92	141
Pos-3,4	1	4	6	7	13	5.85	2.17	105

Table 5: Comparison of Pretest Mean and Posttest Mean for 1-2 Year 3-4 Year College Students.

	Pretest Mean (Total)	Posttest Mean (total)	Difference
Year 1-2	48.6%	20.2%	1.6% ↗
Year 3-4	50.4%	47.8%	2.6% ↘
	Pretest Mean (RA)	Posttest Mean (RA)	Difference
Year 1-2	46%	52.4%	6.4% ↗
Year 3-4	42.9%	45.5%	2.6% ↗
	Pretest Mean (EA)	Posttest Mean (EA)	Difference
Year 1-2	53.2%	63.8%	10.6% ↗
Year 3-4	57.7%	64.9%	7.2% ↗
	Pretest Mean (DC)	Posttest Mean (DC)	Difference
Year 1-2	47.1%	38.4%	8.7% ↘
Year 3-4	50.6%	36.6%	16% ↘

Note: Total means the total number of correct answers in Pretests and

*Posttests, RA represents the category of Recognize Assumptions, EA stands for the category of Evaluate Arguments, and DC is the category of Draw Conclusion.*

*Comparison of 1-2 Year College Students and 3-4 Year College Students.* As shown in Table 4 and 5, there is a slight increase for 1-2 year students, but a noticeable decrease for 3-4 year college students comparing posttest mean with pretest mean. Students from Year 1 and 2 had a 6.4% increase in the categories of Recognize Assumptions compared with a 2.6% increase for Year 3 and 4 students. The increase of Year 1 and 2 is more than doubled of the increase for Year 3 and 4 students. In the category of Evaluate Arguments, there exists a 10.6% and 7.2% increase for Year 1-2 and 3-4 students respectively. For all students, it has a relatively large increase in this category. Both Year 1-2 and 3-4 students showed a decrease in the category of Draw Conclusions, while the rate of decrease for Year 1-2 students is only half of the rate for Year 3-4 students.

## **2. Conclusion and Future Projects**

For all student participants, there is only slight difference between Pretests-total and Posttests-total. There is a noticeable increase in the categories of Recognize Assumptions and Evaluate Arguments and a relatively large decrease in the category of Draw Conclusions. For 1-2 year college students, there is a relatively large increase in Posttest means compared with Pretest means, while there is a decrease in the posttest means for 3-4 year college students. As for the analysis of each individual faculty member, 41% has an increase in Posttest means compared with the Pretest means. Compared with Non-STEM majors, STEM majors did slightly better in both Pretests and Posttests. There is only slight difference between pretest means and posttest means for both STEM and Non-STEM majors. In general, students from Non-STEM majors benefits more from teaching with technology than those in STEM majors.

The targeted student groups for future projects, which aim at increasing critical thinking through technology, should be 1-2 year college students and the outcomes of the tests should be related to extra credits in the course for student engagement. A pretest and posttest on the course content along with Critical Thinking test should be given at the beginning and the end of semester. Data should be collected under Baseline Condition (without using technology in teaching) and Experimental Condition (with technology in teaching) separately.

## **3. Acknowledgement**

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# Perceptions Of The Support Needed By Teacher Counsellors In Secondary Schools In The Ohangwena Region Of Namibia

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## Abstract

This paper explored teacher counsellors' views regarding the support needed in senior secondary schools in Ohangwena region of Namibia. The study was quantitative in nature and a non-experimental design that involved a survey was used. The population of the study comprised of the teacher counsellors in all the senior secondary schools in Ohangwena region. Data was collected using questionnaires which were administered to a sample of twenty-six (26) teacher counsellors. Teacher counsellors were purposively sampled. The data was analysed by use of descriptive statistics in the form of frequencies and percentages. Results indicated that teacher counsellors needed to be supported by parents, teachers, school principals, Inspectors of Education, Regional School Counsellors, and other teacher counsellors, in order to improve the quality of School Guidance and Counselling services in that region of the country. The study recommended that principals, teachers and Inspectors of Education should be educated about the importance of guidance and counselling in schools and their role in the implementation of it. It was also recommended that the number of Regional School Counsellors should be increased to enable them to support the schools in the implementation of guidance and counselling.

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**Keywords:** Teacher counsellor; School counselling; Support; Ohangwena Region; Namibia

## Introduction

Guidance and counselling in schools plays a vital role in preventing educational, emotional, social, personal and other problems among secondary school students (Eyo, Joshua, Esuong, 2009). In addition,

Lunenburg (2010) emphasized that the purpose of guidance and counselling in schools should be to help individual learners to develop the ability to understand themselves, to solve their own problems, and to make appropriate adjustments to their environment. The need for guidance and counselling in schools is further necessitated by the social and economic challenges that today's children and youth face (Bor, Ebner-Landy, Gill & Brace, 2002). The situation in Namibia is worsened by the HIV/AIDS pandemic, which has left many children orphaned and vulnerable (Education Management Information Systems (EMIS), (2012). Fourie (2010) reported that the Ministry of Education in Namibia identified as a priority area the counselling and support of learners affected and/ infected by HIV/AIDS and other vulnerable children. Efforts were thus made to establish Counselling Support Groups in schools in the country, in order to give the necessary support to learners in need.

The National External Schools Evaluation (NESE) annual reports of 2007 and 2008 showed that guidance and counselling services were not fully functional in most schools in Namibia including the senior secondary schools in Ohangwena Region. The reports indicated that (a) the provision for emotional, physical and social needs of learners was weak or non-existent in 47% of secondary schools and 78% of primary schools; and (b) the curricular and vocational guidance of learners was generally poor or non-existent in 58% of secondary, 71% of combined and 47% of primary schools visited in 2008.

Reports for the Ohangwena region revealed that most schools were not attending to the emotional, physical and social needs of the learners; learners were not provided with information and advice in preparation for choice in education, training or employment and the trained teacher counsellors were not providing counselling to learners in need (Ministry of Education, 2008). Clearly, the situation of the School Guidance and Counselling (SGC) in the country, particularly in Ohangwena region is not encouraging. As the NESE reports indicated, guidance and counselling remain very poor in a lot of schools.

In order for the program of Guidance and Counselling to be successful, teacher counsellors need to be supported by all stakeholders in education including school principals, parents, learners and teachers. Principals and other teachers need make efforts to understand and appreciate the value of guidance and counselling services at schools. DeLuccia-Reinstei (2009) argues that the school counsellors' motivation to help student's increases significantly when they do not feel isolated from and not supported by the school staff. DeLuccia-Reinstei (2009) further added that principals, as heads of the schools, have the responsibility for overseeing the implementation of guidance and counselling in their schools. According to

Maluwa-Banda (1998), principals are in a key position to ensure a successful programme by showing interest in it, having a positive attitude towards it, maintaining open lines of communication with teaching staff, counsellors and students concerning the programme, and promoting a climate conducive to professional development and student growth. In his study, one of his findings was that school counsellors received very little support from the administration. In addition, support from other teacher counsellors (peer support) is also important. This is done through cluster meetings where all teacher counsellors in a cluster come together regularly to share ideas and to jointly engage in problem solving and to mutually support each other (Ministry of Education, 2006).

Furthermore, it is trusted that such meetings would be motivational and help sustain the existence of guidance and counselling services in schools. According to the Ministry of Education (2006) in a document titled "Guidelines for the Cluster Facilitator for Counselling (CFC)" cluster meetings would curb isolation and teacher counsellors would be able to benefit from the experiences of their peers in schools.

DeLuccia-Reinstei (2009) is of the opinion that regular training keep school counsellors educated and well-informed. School counsellors thus need to be supported in terms of continuous training to keep them updated. In a study done by Gora, Swatzky and Hague (1992), counselling staff suggested that they could benefit from colleague support groups or in-service programs that would give them opportunities for renewal and camaraderie. Activities of this nature would provide school counsellors with additional skills as well as share experiences with others and would perhaps alleviate some of the job stress associated with school guidance and counselling. Other things that could be done in an effort to support school counsellors include reducing their workload, providing facilities such as a room for individual guidance and counselling for and continuous support from Regional School Counsellors (RSC) and regional officials, such as Inspectors of Education and Education Officers.

This paper therefore assessed the views of teacher counsellors in secondary schools in the Ohangwena education region on the support needed in order to improve the provision of guidance and counselling in schools.

## **METHOD**

### **Research design**

The study followed a quantitative approach to research. A non-experimental design that involved a survey was used in the study. A survey research determines and reports the way things are (Gay, Mills & Airasian, 2009). Since the study sought to obtain information about SGC from the

teacher counsellors' perspective, the survey method was deemed appropriate to the study.

### **Sample**

The sample of the study comprised of all senior secondary school teacher counsellor (approximately 30) from ten senior secondary schools in Ohangwena region. The purposive sampling procedure was used in determining the sample. Purposive sampling is a process of selecting a sample that is believed to be representative of the group to be sampled (Gay et. al, 2009). Teacher counsellors were selected to take part in the study as they have the information and insight knowledge with regard to guidance and counselling in secondary schools. Thirty (30) questionnaires were distributed to the teacher counsellors and of these, 26 questionnaires were returned, which represents approximately 87 % of the entire population.

### **Research Instruments and Procedure**

Data was collected using researcher-designed questionnaires. The questionnaire comprised scaled questions. Teacher counsellors were asked to respond to a three-point rating scale of *very important*, *important* and *not important*. Teacher counsellors were also asked to indicate the degree of support they received from the different categories of people listed. A three-point rating scale of *no support*, *little support* and *a lot of support* was used. The use of questionnaires ensures that responses are gathered in a standardised way, so questionnaires are more objective. A pilot study was done with five teacher counsellors from five secondary schools in Ohangwena Region. This was done to determine whether participants would understand the questions; to provide information about deficiencies as well as suggestions for improvement; and to find out whether the questions were relevant and appropriate.

After the proposal was approved by the University's Postgraduate Studies Committee to conduct the study, further permission was sought and granted from the Permanent Secretary of the Ministry of Education and the Director of Education: Ohangwena Directorate.

### **Data analysis**

The Statistical Package for Social Sciences (SPSS), which is an application that provides statistical analysis of data, was used to analyse the bulk of the teacher counsellors' responses. Descriptive summary statistics in the form of simple frequencies and percentages were used.

## RESULTS AND DISCUSSION

The section of this presents the demographic data of teacher counsellors, followed by the results and discussion on support needed by teacher counsellors. The results are presented below:

### Demographic variables of teacher counsellors

Table provides the frequency and percentage frequency of the demographic variables of teacher counsellors who responded to the questionnaire.

**Table 1:** Frequency distribution of demographic variables of teacher counsellors

Characteristic	Category	f	%
<b>Gender</b>	Male	6	23.1
	Female	20	76.9
<b>Age</b>	Younger than 25	2	7.7
	26-29	6	23.1
	30-34	3	11.5
	35-39	7	26.9
	40-49	5	19.2
	50-59	3	11.5
	60 or more	0	0
<b>Qualifications</b>	Degree +additional postgraduate qualification	6	23.1
	Degree+ teaching diploma	0	0
	Teaching degree	6	23.1
	Teaching diploma+ postgraduate qualification	8	30.8
	Teaching diploma	6	23.1
	Certificate other	0 0	0 0
<b>Position</b>	Principal	0	0
	Vice-principal	0	0
	Head of Department	5	19.2
	Subject head	4	15.4
	Teacher	17	65.4
	Other	0	0
<b>Teaching experience</b>	Less than 1 year	1	3.9
	1-5 years	7	26.9
	6-10 years	7	26.9
	11-15 years	6	23.1
	16-20 years	2	7.7
	More than 20 years	3	11.5
<b>Counselling experience</b>	Less than 1 year	7	26.9
	1-2 years	4	15.4
	3-4 years	10	38.5
	5-10 years	5	19.2
	More than 10 years	0	10

### Gender:

The majority of participants (76.9%) were female teacher counsellors as compared to only (23.1%) male teacher counsellors.

**Age:**

Responses pertaining to age showed that most of the teacher counsellors were in the age category of 35-39 years (26.9%). This was followed by teacher counsellors in the age categories of 26 – 29 years and 40 – 49 years, with (23,1%) and (19.2%) respectively. Teacher counsellors in the age categories of 30 – 34 years and 50 – 59 years were equally represented with (11.5%) each.

**Qualifications:**

When the qualifications of teacher counsellors were analysed, it emerged that the majority of teacher counsellors (30.8%) had a teaching diploma plus a postgraduate qualification. This was followed by teacher counsellors who are having a teaching degree and those with a teaching diploma and degree + additional postgraduate qualification at (23.1 %) each. None of the participants had a degree + teaching diploma or a certificate.

**Position:**

The majority of the teacher counsellors who participated in the study were just ordinary teachers (65.4%), with (19.2%) and (15.4%) being Heads of Departments and subject heads respectively. None of the participants were principals or vice-principals.

**Teaching experience:**

The majority (26.9%) of the teacher counsellors had 1-5 years and 6-10 years of teaching experience. Those with 11-15 years, more than 20 years and 16-20 years of teaching experience had (23.1%), (11.5%), and (7.7%) respectively. Respondents with less than one year of teaching experience had the lowest representation of only (3.9%).

**Counselling experience:**

The majority of the teacher counsellors (38.5%) fell in the 3-4 years range of experience as teacher counsellors. The table further shows that a considerable number of them had experience as teacher counsellors of less than a year (26.9%). This was followed by respondents with experience as teacher counsellors of 5-10 years at (19.2%) and (15.4%) respectively. None of the respondents had counselling experience of more than ten years.

**Type of support**

The following items concern the types of support needed by teacher counsellors in order for them to carry out their duties effectively. Teacher counsellors were asked to rate the suggested types of support according to

what they believed to be more important and those which were not very important. The results are summarised in Table 2.

**Table 2:** Type of support teacher counsellors need

Item	EXTENT OF AGREEMENT OR DISAGREEMENT WITH STATEMENT							
	Very important		Important		Not important		Total	
	f	%	f	%	f	%	F	%
1. Peer support (support from other teacher counsellors)	19	73.1	7	26.9	0	0	26	100
2. Support from parents	23	88.5	3	11.5	0	0	26	100
3. Support from other teachers in the school	16	61.5	10	38.5	0	0	26	100
4. Support from the principal	22	84.6	3	11.5	1	3.85	26	100
5. Support from the Inspector of Education	18	69.2	7	26.9	1	3.85	26	100
6. Regular visits by RSCs	17	65.5	8	30.8	1	3.85	26	100
7. Regular visits by the cluster facilitator for counselling	12	46.1	10	38.5	4	15.4	26	100
8. Administrative Support	13	50	11	42.3	2	7.7	26	100
9. Regular in-service training (workshops)	22	84.6	4	15.4	0	0	26	100

The majority of the teacher counsellors (73.1%) rated support from other teacher counsellors (peer support) as very important. The results indicate that the vast majority of teacher counsellors indicated that there is a need to strengthen peer support among teacher counsellors. This finding is supported by the literature, as the MoE (2006) stated that Cluster Facilitators for Counselling (CFC) groups should be established and should convene regular meetings with teacher counsellors in their clusters to share ideas, to jointly engage in problem solving and to mutually support each other.

The deduction that could be made here is that teacher counsellors would benefit from regular meetings with other teacher counsellors for developmental purposes in order to improve their counselling skills. This will help teacher counsellors to stay motivated, to curb isolation and to be able to benefit from the experiences of other teacher counsellors. With peer support, teacher counsellors give informal support to individual teacher counsellors requesting help with specific problems. Peer support among teacher counsellors should thus be strengthened.

Of the sample, (88.5%) indicated that support from parents was very important. Only (11.5%) of the teacher counsellors indicated that support from parents was just important. None of the teacher counsellors said it was not important. The teacher counsellors indicated the need for parents to work together with schools, stating that parents should inform schools about their

children's medical, social or psychological problems that their children may have. In agreement with this finding are Gora et al. (1992) who reported that lack of parental involvement had been instrumental in a negative outcome, citing that school counsellors had little impact when parents or significant adults in the learner's life refused to acknowledge the problem or when parents neglected to follow through with the suggestions provided. Having parents support schools where guidance and counselling is concerned would help teachers to have a better understanding of learners' behaviour and to be in a better position to assist them. It is thus vital that parents be available to be contacted whenever learners experience difficulties that require the involvement of teacher counsellors so that parents can support the school and the learners accordingly. Parents' support is vital as in most cases, parents know their children better.

The results of the study further showed that more teacher counsellors valued the support of other teachers as very important as indicated by 61.5%. This means that they see other teachers as instrumental in the implementation of guidance and counselling and should thus give the necessary support to teacher counsellors. This finding is supported by DeLuccia-Reinstei (2009) who noted that teacher counsellors' motivation to help learners increases significantly when teacher counsellors do not feel isolated and do not lack support from staff members. This view is also shared by Lunenburg (2010), who stated that at schools where guidance and counselling programmes are effective, staff members work cooperatively. Being cooperative is exhibited in the degree of active interest, mutual help, and collaboration among teachers, the principals and the teacher counsellors. This is important as teachers are the ones who interact with learners on a daily basis and are thus in a better position to notice any behaviour change in a learner. The teacher would then be able to refer such learners to the teacher counsellor.

The lesson that could be learned here is that the teacher counsellors and teachers should work together in identifying and helping learners with difficulties.

Almost all the teacher counsellors believed that in order for school guidance and counselling to succeed, principals should fully support the programme.

This finding is consistent with the views expressed by Myrick (2003), who reported that the principal provides support and encouragement to the teacher counsellors. It is important for the principal, as head of the school, to take the lead in the implementation of the SGC programme at the school. When the principal shows support for the programme, people in the school are likely to follow what he is doing. Furthermore, the responsibilities of teacher counsellors include assisting school managements in dealing with

severe cases of misconduct by learners. For this to happen, principals and school counsellors need to work together, so that they will be able to assist learners.

The study further revealed that the majority of teacher counsellors rated support from Inspectors of Education as very important. However, as can be seen in Table 2, teacher counsellors generally felt that Inspectors of Education showed very little interest towards guidance and counselling. It is possible that Inspectors of Education themselves do not have much knowledge of school guidance and counselling, making it difficult for them to support teacher counsellors. The challenge would thus be to educate Inspectors of Education about guidance and counselling and the need for it in schools. Only then will they take the lead and support teacher counsellors in the implementation of guidance and counselling in school.

Support from Regional School Counsellors through regular visits to schools was rated as very important by the 65.5% of the teacher counsellors. According to the Ministry of Education (1994), the duties of RSCs include rendering guidance and counselling to learners and assessing learners who show symptoms of behavioural change and loss of abilities to cope in the educational setting and assisting learners with vocational guidance. For RSCs to be able to render these services to learners, they need to visit schools regularly. Through school visits, RSCs are able to give teacher counsellors guidance in dealing with difficult cases. Monitoring of the guidance and counselling services at schools by RSCs is also done during visits to schools.

The respondents believe that regular visits by Cluster Facilitators for Counselling are important as most of them rated it as important. The Ministry of Education (2006) is in agreement with this, as all clusters were mandated to have a cluster facilitator. Through visits to schools, the cluster facilitators will help teacher counsellors with difficult cases and ensure that the SGC programme is running properly at the schools. However, it would be difficult for CFCs to visit schools as they do not have resources, such as transport to go to schools. In addition, CFCs already have their own loads at their schools. The challenge would thus be to strengthen the support from the cluster facilitators to teacher counsellors by allocating the necessary resources to CFCs and reducing their workload.

Administrative support was seen as very important in the implementation of guidance and counselling in schools, with half (50%) of the teacher counsellors indicating that it is important. This means that teacher counsellors need to be given administrative support (e.g. paperwork, completing, updating and monitoring cumulative record cards at the school, etc.) in order to effectively render guidance and counselling services to learners.

Having other school personnel such as teachers and school secretaries assist with the administrative work would ease teacher counsellors' workloads. It is thus imperative that teacher counsellors are given administrative support in order to successfully implement school guidance and counselling in schools.

Furthermore, the majority of teacher counsellors (84.6%) rated support through regular in-service training as important. This finding is in agreement with that found by Gora et al. (1992) who also found that counselling staff benefited from in-service programmes, and that it gave them renewal and camaraderie. Maluwa-Banda (1998) also identified training of teacher counsellors as important in the implementation of guidance and counselling in schools. In-service training, which brings about improved skills and knowledge, is very important to the success of the guidance and counselling programme in schools. Regular in-service training for teacher counsellors should thus be made a priority, to ensure the success of guidance and counselling programmes in schools.

### Degree of support received by teacher counsellors

Teacher counsellors were asked to indicate the level of support they received from the categories of people listed. More teacher counsellors indicated that they received no support at all from Inspectors of Education and cluster facilitators for counselling, parents and Learners' Representative Councils (items 2, 6, 7 and 9). On the other hand, a significant number of teacher counsellors indicated that they got little support from RSCs, school principals, Head of Departments and other teachers (items 1, 3, 4 and 5). In addition, more teacher counsellors indicated that they got a lot of support from hostel supervisors (item 8). The results are summarised in table 3.

**Table 3:** Degree of support teacher counsellors receive

Category of people	AGREEMENT OR DISAGREEMENT WITH STATEMENT							
	No support		Little support		A lot of support		Total	
	f	%	f	%	f	%	f	%
1. The Regional school counsellor (RSC)	4	15.3	17	65.4	5	19.2	26	100
2. The Inspector of Education	17	65.4	9	34.6	0	0	26	100
3. The school principal	4	15.3	12	46.1	10	38.5	26	100
4. The head/s of department/s	3	11.5	16	61.5	7	26.9	26	100
5. Other teachers	3	11.5	16	61.5	6	23.1	25	96.2
6. Cluster Facilitator for Counselling (CFC)	21	80.8	5	19.2	0	0	26	100
7. Parents	12	46.1	10	38.5	4	15.3	26	100
8. The hostel supervisors	1	3.85	8	30.8	10	38.5	19	73.1
9. Learners' Representative Council (LRCs)	13	46.1	7	26.9	4	15.3	23	88.5

The majority of the teacher counsellors (65.4%) indicated that they received very little support from RSCs. Of the total number of participants, (19.2%) showed that they got a lot of support from RSCs. Only (15.3%) indicated that they did not receive any support from them. The majority of the teacher counsellors indicated that they received very little support from the RSCs. As discussed earlier, teacher counsellors indicated that support from the RSCs was very important. The lack of support from the RSCs could be attributed to the fact that Ohangwena Region with nearly 250 schools has only three RSCs (EMIS, 2010). This makes it very difficult for them to reach all the schools and give teacher counsellors the necessary support. This means that supervision, guidance to teacher counsellors and monitoring of guidance and counselling activities by the RSCs at schools are not done on a regular basis. RSCs are instrumental in the implementation of guidance and counselling in schools, thus their supports to teacher counsellors need to be intensified. It should thus follow that more RSC need to be appointed, in order for them to support teacher counsellors accordingly.

An overwhelming majority of the teacher counsellors, (65.4%) indicated that they received no support at all from Inspectors of Education when it came to guidance and counselling issues, with the remaining (34.6%) of teacher counsellors saying that they received little support from them. This is in agreement with findings of a study done in Namibia by Vergnani, Frank, Haihambo Ya-Otto and Mushaandja (2010) who established that Inspectors of Education did not play any meaningful role in monitoring school counselling activities and are inadequately informed about counselling and the role they should play in this regard.

Table 2 further shows that 46.1% of the participants indicated that they received little support from the principals. Only, 38.5% of the teacher counsellors indicated that they received a lot of support from school principals, with 15.3% of them saying that they received no support from RSCs. This finding is consistent with results found by Bulus (2001); Denga (2001); and Edet (2008) cited in Eyo et al. (2009), who reported that principals constitute the greatest obstacle to the success of guidance and counselling services in schools. The principal's role is to provide leadership for the guidance and counselling programme. With such an important role to play, lack of support from the principal will definitely hamper the successful implementation of guidance and counselling services in schools.

Principals should therefore render the necessary support to the teacher counsellors and play their part in the implementation of guidance and counselling programmes at their schools.

With regard to the support given to teacher counsellors by Heads of Departments (HoDs), the majority (61.5%) responded that they received little support, while (26.9%) indicated that they got a lot of support from

them. A few teacher counsellors (11.5%) indicated that they got no support from Heads of Departments. HoDs are second in command at most schools, and as such have a lot of influence at the schools. Whether they support or do not support a programme, they are likely to influence other teachers' attitudes towards such a programme. The reason why HoDs do not support teacher counsellors could be a lack of knowledge about the importance of guidance and counselling in schools. In addition, HoDs might not be aware of the roles they have to play in the implementation of guidance and counselling in schools. A major challenge would thus be to educate HoDs on guidance and counselling and more importantly, on the roles they have to play in the implementation of guidance and counselling.

Furthermore, the majority of the teacher counsellors (61.5%) indicated that they receive no or little support from fellow teachers. This result is supported by DeLuccia-Reinstei (2009) who contended that teacher counsellors' motivation to help learners increases significantly when they do not feel isolated and do not lack support from staff. Teachers must therefore be made aware of the important role they play in the implementation of SGC.

Teachers are the ones who deal with learners on a daily basis and are thus in a position to identify and refer learners to teacher counsellors for counselling.

With regard to the support given to teacher counsellors by Cluster Facilitators for Counselling (CFCs), an overwhelming majority of the participants (80.8%) indicated that they received no support from CFCs. The remaining (19.2%) said they received little support. This is contrary to what was stated by the MoE (2006), that there should be cluster facilitators to render support to other teacher counsellors. This might be due to too much work on the part of cluster facilitators. They are normal teachers with normal teaching loads and they carry the responsibility of guidance and counselling at their schools, in addition to being cluster facilitators. As such, going to schools in their clusters to render support to other teacher counsellors might be difficult. Another reason for the failure of the cluster facilitators supporting other teacher counsellors could be the issue of transport. This is especially true in rural schools, where distances between schools are very long.

More participants (46.1%) indicated that they received no support from parents, while (38.5%) indicated that they received little support from them. The remaining (15.3 %) indicated that they got a lot of support from parents. Paralleling this finding, Gora et al. (1992) found that a lack of parental involvement was instrumental in a negative outcome, citing that school counsellors had little impact when parents or significant adults in the learner's life refused to acknowledge the problem or when parents neglected to follow through with the suggestions provided. The situation in Namibia is

further worsened by the HIV and AIDS pandemic, which has left many children orphaned. The Ministry of Health and Social Services (MoHSS), (2006 – 2007), revealed that the proportion of children considered to be orphaned at the time of the survey was (28%) of all children in Namibia. In most cases, these children live with grandparents, who are already burdened with a lot of responsibilities, making their involvement in the education of the children difficult. Parents or guardians should thus be sensitised about the importance of guidance and counselling and what role they need to play. This can be done during parents' meetings.

Hostel supervisors rendered a lot of support as indicated by 38.5% of the participants. However, 30.8% of the participants indicated that they received little support from hostel supervisors. In schools, hostel supervisors get to know the learners very well and are thus a great source of information about learners. Some of the duties of hostel supervisors include establishing effective procedures for the care and well-being of learners at the hostel, as well as administrative and disciplinary functions. Efforts should thus be made to include hostel supervisors in the committee for counselling at schools, even if it is just on a "when a need arises" basis.

The results further showed that the majority of the teacher counsellors received no support at all from Learners' Representative Council (LRC). An LRC is a group of learners in a school elected by their fellow learners. For them to support teacher counsellors they need to know and understand what guidance and counselling is all about.

They might not be very knowledgeable in guidance and counselling, thus their support will be minimal. Research has however proven that peer counselling is effective and efforts should therefore be made to involve the LRCs in the guidance and counselling programmes at schools. Learners can be trained to offer guidance and counselling to their peers. This is based on the understanding that learners tend to relate more to those peers with whom they are comfortable. The peer counsellor also assists in identifying and making referrals to the teacher counsellor. Days should be set aside for them to share experiences and information with their peers, through various means such as dramas, role-playing, talks, poetry, etc. In this way, the LRC would thus be providing support to teacher counsellors.

### **Conclusion and Recommendations**

From the findings of this study, it can be concluded that teacher counsellors viewed the support from different stakeholders as inadequate and that for the guidance and counselling programme to succeed, teacher counsellors should be accorded the necessary support. Inspectors of Education, principals, HoDs and teachers should all be sensitised in school

guidance and counselling so that they can understand and appreciate the value of the guidance and counselling services in schools.

Principals and HoDs would then be able to see to it that guidance and counselling programmes are implemented and for them to be able to monitor and render support to teacher counsellors. Similarly, teachers will work together with teacher counsellors in identifying and referring learners with difficulties to teacher counsellors.

From the study it also emerged that cluster meetings for counselling do not take place as frequently as they should. Consequently, peer support is lacking among teacher counsellors. It is thus recommended that networking amongst teacher counsellors be strengthened to allow teacher counsellors to share ideas, to jointly engage in problem solving, and to mutually support each other. The study established that teacher counsellors would need support from teachers and principals. It is thus recommended that principals and teachers strengthen their support to teacher counsellors.

The role of parents in the success of the guidance and counselling programmes in schools is indeed a formidable one, which should not be ignored. The study revealed that parental involvement in the guidance and counselling of their children is low. The study therefore recommends that parents play a more active role in this regard. Finally, the study established that the current number of RSCs in the region makes it difficult for them to reach out and fully support teacher counsellors because of the size of the region. It is thus recommended that the Ohangwena Region should appoint more RSCs, preferably, one RSC in each circuit.

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# Medical Student Neurophobia: A Review Of The Current Pandemic And Proposed Educational Solutions

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## Abstract

Traditionally, the subject of neuroscience has been one of the most difficult courses for medical students in undergraduate medical education. Over the last few decades, a fear of neurology and the neurosciences, termed neurophobia, has presented among medical students around the world. Today, neurophobia has resulted in medical students not learning neurology and neurosciences to a sufficient extent to be able to apply this knowledge to patients presenting with neurologic symptomatology. To address the crisis at hand, medical educators have developed novel learning modalities to fight this chronic disease of medical students. In this brief review, I examine the educational literature regarding the current pandemic of neurophobia as well as analyze published novel educational modalities that may be used to diminish neurophobia among medical students.

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**Keywords:** Neurophobia, neuroscience, neurology, medical education

## Introduction

The term neurophobia was created over two decades ago to describe medical students' fear of neurology and the neurosciences (Jozefowicz 1994). Today, neurophobia has run rampant among medical students with studies confirming a significant fear of neurology and the neurosciences in the United States, China, United Kingdom, Ireland, Sri Lanka, and the Caribbean (Ramos et al. 2016, Zinchuk et al. 2010, Lukas et al. 2014, Pakpoor et al. 2014, Flanagan et al. 2007, Matthias et al. 2013, Youssef 2009). Worldwide emergence of this phenomenon has encouraged medical educators around the globe to develop potential solutions to this problem (Roze et al. 2016, Dao et al. 2015, Anwar et al. 2015, Hudson 2006). This manuscript will review the current educational literature addressing neurophobia in various countries around the world. Furthermore, this

manuscript will analyze published novel learning modalities that seek to address and diminish neurophobia among medical students.

### **United States**

In a study by Zinchuk (2010), questionnaires were administered to third and fourth year medical students at a United States medical school and to internal medicine residents affiliated with the particular medical school. The questionnaire examined the difficulty of eight clinical specialties, including neurology (Zinchuk et al. 2010). Respondents indicated that they felt neurology was the clinical specialty that they had the least amount of knowledge in ( $p < 0.001$ ) as well as neurology being the most difficult clinical rotation ( $p < 0.001$ ) (Zinchuk et al. 2010). Furthermore, medical students indicated that they had the least amount of confidence when confronted with patients presenting with neurological complaints (Zinchuk et al. 2010). Zinchuk (2010) concluded that both medical students and residents exhibited significant difficulty as well as a low degree of confidence when confronted with patients presenting with neurologic symptomatology.

### **China**

An investigation by Lukas (2014) surveyed senior medical students at a medical school in Wuhan, China, on their perceptions regarding knowledge of clinical neurology. Collected data indicated that students' self-assessment of knowledge pertaining to neurology ranked low, but not the lowest rank possible (Lukas et al. 2014). Furthermore, a positive correlation was observed between diagnosing/managing neurological patients and likelihood of specializing in the field of neurology (Lukas et al. 2014).

### **United Kingdom**

In an inquiry by Pakpoor (2014), an online survey was implemented to all United Kingdom medical schools. The data indicated that medical students found neurology to be significantly more difficult than other clinical specialties (Pakpoor et al. 2014). Moreover, medical students were the least comfortable with thinking of a neurological differential diagnosis relative to the other clinical specialties ( $p < 0.0001$  for neurology) (Pakpoor et al. 2014).

### **Ireland**

In a study by Flanagan (2007), questionnaires were administered to medical students as well as physicians from various colleges and hospitals throughout Ireland. The questionnaire was administered in two parts. The first part addressed medical students' perceptions of knowledge in neurology and confidence in dealing with patients with neurologic symptoms (Flanagan et al. 2007). Data in the first section of the questionnaire indicated that the

respondents felt that their knowledge in neurology was limited ( $p < 0.005$ ) after nephrology, geriatrics, and rheumatology (Flanagan et al. 2007). Furthermore, participants found neurology to be the most difficult clinical specialty over all other disciplines ( $p < 0.001$ ) (Flanagan et al. 2007). The second part of the questionnaire requested respondents to indicate the reason why neurology was perceived as a difficult clinical specialty (Flanagan et al. 2007). Data in the second section of the questionnaire indicated that the number one reason respondents felt neurology to be a difficult specialty was due to poor teachings of neurology (Flanagan et al. 2007).

### **Sri Lanka**

An investigational study by Matthias (2013) evaluated medical students' perceptions of neurology, via questionnaires, from the University of Sri Jayewardenepura, in Sri Lanka. Medical students indicated that neurology was the least interesting clinical specialty (18.5%), the most difficult specialty for the majority of medical students (50.0%), and the specialty in which they had the least amount of confidence in dealing with patients presenting with neurologic symptomatology (i.e., headache, numbness of extremities, dizziness) (Matthias et al. 2013). Furthermore, the major reason as to 'why neurology was the most difficult clinical specialty' was determined to be the necessary understanding of neuroanatomy and the complex neurologic examination (Matthias et al. 2013).

### **The Caribbean**

A cross-sectional study by Youssef (2009) surveyed senior medical students of the University of the West Indies, St. Augustine, Trinidad & Tobago, in the Caribbean. Medical students were asked four questions: (i) "What is your current level of interest in the following medical specialties?"; (ii) "What is your current level of knowledge in the medical specialties?"; (iii) "Do you think the subject is easy or difficult?"; (iv) "Why do you think neurology is difficult?" (Youssef 2009). Data collected showed that medical students found neurology to be the most difficult clinical specialty as well as the specialty that students had the least amount of knowledge in ( $p < 0.001$ ) (Youssef 2009). The major contributor to difficulty with neurology was determined to be the requirement to understand neuroscience, which was closely followed by the complex neurologic examination (Youssef 2009).

### **Recent Educational Solutions Addressing Neurophobia**

Given the well-documented phenomenon of neurophobia worldwide, medical educators have begun to bring forth potential solutions to the crisis at hand (Zinchuk et al. 2010, Lukas et al. 2014, Pakpoor et al. 2014, Flanagan et al. 2007, Matthias et al. 2013, Youssef 2009). In response to

neurophobia among medical students, educators have initiated innovative simulation-based programs, applied neuroanatomy electives, team-based learning in neuroscience blocks, and case-based teaching within the neuroscience block of the medical curriculum (Roze et al. 2016, Dao et al. 2015, Anwar et al. 2015, Hudson 2006).

A proposed learning modality by Roze (2016) to improve the understanding of neurological semiology was to initiate simulation training. A simulation-training program known as 'The Move' was implemented for third year medical students of Pierre and Marie Curie University in Paris, France, throughout the students' rotation in neurology (Roze et al. 2016). Using only mime gestures, medical students were taught to role-play patients presenting with neurologic syndromes such as parkinsonian, vestibular, pyramidal, and cerebellar (Roze et al. 2016). Furthermore, tonic-clonic seizures, axonopathies, and chorea were also taught and mimed by students (Roze et al. 2016). Questionnaires were administered to the students and teachers investigating the impact of the program (Roze et al. 2016). Students indicated that The Move program increased their motivation to understand neurologic semiology (78%) as well as improved both their long-term memorization of the neurologic syndromes (86%) and understanding of neurology (77%) (Roze et al. 2016). Moreover, 77% of students thought the skills learned in The Move would be useful for their clinical practice in the future (Roze et al. 2016). Importantly, 87% of students and 95% of teachers thought that it would be beneficial to include The Move program in their medical curriculum (Roze et al. 2016).

Granted that a cause of neurophobia is a poor understanding of neuroanatomy, Dao (2015) examined the efficacy in implementing an applied neuroanatomy elective dependent upon students utilizing interactive and artistic activities. Offered to first-year medical students, the elective in neuroanatomy consisted of four sessions encompassing four neurosensory modalities including taste/olfaction, auditory, vision, and proprioception/balance (Dao et al. 2015). Each module was 2-hours in length consisting of a 15 minute lecture component and 105 minute laboratory component (Dao et al. 2015). The lecture component was comprised of a review of the neurosensory pathways, clinical vignettes pertaining to neurology, and an introduction to the laboratory component (Dao et al. 2015). The laboratory component consisted of specific activities targeted to enforce the neurosensory pathways taught in the previous lecture component: (i) taste/olfaction module integrated foods that highlighted each of the five taste sensations; (ii) auditory module integrated beat-matching music, DJing, and creating new sounds with use of synthesizers; (iii) visual module integrated photography as well as experiencing touch alone with use of blindfolding; (iv) proprioception/balance module integrated balance with

unicycling, balance boarding, slack lining, and yoga (Dao et al. 2015). Data collected pre- and post-course indicated that the medical students were significantly more familiar as well as comfortable with the taste/olfaction, auditory, vision, and proprioception/balance pathways that were taught to them (Dao et al. 2015).

Recently, team-based learning has increasingly been regarded by undergraduate medical schools as an effective teaching modality to assist students in understanding lecture material (Anwar et al. 2015). In a study by Anwar (2015), team-based learning was implemented throughout a third-year neuroscience block. Medical educators evaluated the effect of team-based learning on student learning and correlated it with the medical student's academic performance in the summary exam (Anwar et al. 2015). Data showed that students who attended the team-based learning modules performed better on the summary exam than those who did not attend team-based learning modules (Anwar et al. 2015).

A case based teaching modality was developed and implemented at Adelaide University in the Department of Physiology to integrate neuroscience with clinical neurology in the undergraduate medical curriculum (Hudson 2006). Each medical student attended a total of four 2-hour case based teaching exercises: (i) sensory function module teaching the interpretation of findings in the patient history; (ii) motor function module teaching the interpretation of motor and sensory physical examination findings; (iii) a combined module on cranial nerve function and radiological imaging teaching the interpretation of cranial findings and utilizing radiological imaging to confirm a diagnosis, respectively; (iv) higher function module teaching how to present patients with neurologic symptomatology (Hudson 2006). Data from the case based learning initiative was gathered via questionnaires pertaining to the efficacy of the learning modality (Hudson 2006). Overall, students reported that case based learning was effective in facilitating an integration of clinical neurology with the neurosciences (Hudson 2006). Some students admitted to neurophobia, which was alleviated by the initiative to a degree; however, these students requested additional case based learning modules to further reduce their neurophobia (Hudson 2006).

## **Conclusion**

A chronic disease of medical students, neurophobia has been reported to affect students around the world. Novel initiatives are essential not only to cure those currently affected but also to prevent the next generation of physicians from developing a fear for neurology and the neurosciences.

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