



Review

Exploring the disconnect between developmental stage and academic expectations: Implications for nursing education

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1. Introduction

Nursing educators in Canada may be challenged to find effective ways to teach higher order thinking skills to novice learners who may not yet have the ability to apply them in the context of nursing practice. Executive functions such as reasoning, judgment, decision-making and prioritization are some of the first critical skills introduced in nursing school. While developing these skills is vital to practicing nursing, these are the skills many novice students have the most difficulty learning. Globally, the majority of students entering undergraduate nursing programs have barely reached young adulthood. Much has been written about the needs of novice learners in nursing education as well as the learning needs of adolescents; however, less is known about the learning needs of the novice-nursing student who is also still entrenched in the adolescent stage of development.

As nursing educators, we continue to witness our younger undergraduate nursing students struggle despite our efforts to accommodate and mentor students who need additional support. Efforts to revise curriculum based on student feedback have also been seemingly unsuccessful to date. The question that remains then is whether educators' collective expectations are fair and reasonable given the development stage of the many students entering nursing programs today. Is it possible that the problem does not lie in the content that is delivered in nursing curricula, but that the timing and methods are the issue? Is it possible that we are introducing vital concepts to nursing students who are not yet equipped with the cognitive capacity to learn them?

The transition from post-secondary school to University is a perilous one for so many novice-nursing students. University program expectations may be most appropriate for students in their early to mid-twenties, but less so for students still entrenched in the developmental tasks of adolescence.

Students entering a nursing program directly from secondary school, or soon thereafter, may have more in common with the developing adolescent than the traditionally defined adult. This raises some important questions around the experience of adolescents transitioning to higher education, the cognitive and socioemotional processes affecting learning, and the expectations of students within curricula and programs that must be appropriate for their developmental stage. Some of the concepts that nursing students have the most trouble with make more sense when we consider their connection to the 'in-progress'

processes of students' maturing adolescent brain structures. Engaging with and understanding nursing students as adolescents, rather than adults, may be the key to smoother transitions after post-secondary school, decreased mental health effects of stress and anxiety, and learning activities that are thoughtful and responsive to students' developmental stage.

While post-secondary school is often seen as a rite of passage marking the beginning of adulthood, novice students may not be ready to learn like adults. Moreover, they may not be capable of it just yet. Many undergraduate students enter their nursing education program directly from high school, which means many are 18 years old, and in a few cases, still 17. Very early on, novice-nursing students are expected to be able to articulate their vision of their nursing identity at the same time that they may be wrestling with their own personal identity. The assumptions made about students' level of cognitive, social, and emotional development on entry to the program may work against them from an educational perspective.

The World Health Organization [WHO] (2018) offers a broad description of what 'adolescence' actually means. Importantly, they are careful to emphasize that adolescence is more than just an age range. Age, they contend, is an apt measurement of biological change in adolescence, as this tends to be mostly universal. However, age is not as useful in terms of the psycho/socio/emotional changes during adolescence, which tend to be highly variable. The capabilities, previous experiences, and developmental maturation of novice students in a nursing program is also highly variable, and it is for these reasons that the WHO description of adolescence will be used throughout the remainder of this paper. Generational differences are referred to in terms of their cultural influence (Twenge et al., 2018). The terms 'adolescent' and 'adolescence' will include the description of 'emerging adult' used in the literature to describe the adolescent population said to be 'in transition' somewhere on the continuum to adulthood (Arnett, 2014). Similarly, there is no generally accepted definition of what it means to be an 'adult' either (Merriam & Bierema, 2014). Most definitions in the literature seem to agree that adulthood, as well as the end of adolescence, is largely a sociocultural construct (Dumontheil et al., 2016; MacArthur Foundation, 2019; Merriam and Bierema, 2014), which is highly context dependent.

Anecdotally, the authors' collective experience teaching first and second year undergraduate nursing students has revealed a disparity

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between curricular, course, and faculty expectations of students and their demonstrated abilities. Every year, students grapple with executive functions like reasoning and judgment despite their explication in preparatory readings, courses, and learning activities. Students enter the program with extremely high secondary school graduating averages. The students are engaged in numerous extra-curricular activities, they volunteer in their communities, and they are generally bright, well-rounded young people. Despite this, the students seem to struggle with reasoning their way through simple tasks and case studies in their first and second years of nursing school. They wrestle with decision-making in simple contexts, and have difficulty translating what they have learned in one situation to the next. They express fear at having to communicate with clients, and they demonstrate difficulty with knowing what questions to ask a client and how to predict possible outcomes. It is important to note that these challenges are not seen to the same degree in mature or second-entry nursing students.

While there is nothing wrong with the students' level of intelligence, work ethic or generation, the authors' argue that the reason students have so much trouble is because they are not cognitively mature enough to engage in these types of sophisticated processes. They are still developing as adolescents and have yet to complete, and/or refine, many of the cognitive processes needed to meet academic expectations.

2. Background literature

2.1. Literature search

A broad search was conducted in order to locate information in the areas of adolescent brain development, adolescent learning, novice undergraduate nursing education. Articles and books for this paper were sourced through the databases ProQuest Education Journals, the Cumulative Index for Nursing and Allied Health (CINAHL), Google Scholar, Scholar's Portal, and psychINFO using search terms Adolescence, Adolescent brain development, Adolescent development, Adolescent learning needs, Adult learning needs, and Transition to post-secondary. Initial inclusion criteria initially were publication dates between the years 2000–2018, and publication in peer-reviewed journals in the English language. Research on the adolescent brain has been the subject of tremendous growth and discovery over the past 3 decades, therefore this reference period was selected to ensure comprehensive coverage. The date range selected was also intended to capture articles regarding the state of a science that has remained relatively stable over a long period of time, such as anatomical structure and function of particular areas of the brain.

Exclusion criteria was focused on publication date outside the chosen range, and articles that did not align closely enough with the topic, such as some neuroscientific research articles with foci beyond the scope of this paper. In addition to the articles procured via the database searches, an online article from the American Psychological Association was retained, as was an online presentation from the Mental Health Commission of Canada, and two print books plus one online book on adolescent development. The books were included because they so closely aligned with the purpose of this paper, as opposed to some other books which were excluded due to their inability to adequately address the main query of this article.

2.2. The adolescent brain

With young people living at home longer, pursuing higher levels of education, and assuming the responsibilities usually associated with adulthood later in life, the periods of adolescence and adulthood are more social in nature than they once were. From a social perspective, adulthood has been pushed forward to allow adolescence to stretch into the mid-20s. Biologically, the brain has reached its adult size by adolescence but continues to mature and myelinate until the age of 25 (Anderson, 2015; US Department of Health and Human Services, 2018),

long after the majority of nursing students have graduated from the nursing program.

While the entire brain is underdeveloped in adolescence, the prefrontal cortex (PFC) is the area that has received the greatest attention in neuroscience discourse over the past two decades (Anderson, 2015; Blakemore, 2012; Blakemore and Robbins, 2012; Davis, 2014; Fuster, 2002; Giedd, 2002; Giedd, 2004; ; Klenber et al., 2001; Lebel and Beaulieu, 2011; Rubia et al., 2000; Spear, 2013; World Health Organization [WHO], 2018; Yurgelun-Todd, 2007). The PFC controls many cognitive functions including working memory, the ability to plan, form judgements, and pay attention (Parris, 2008). It also plays a role in how a person organizes their thoughts, controls impulses and emotions, and how they interpret the actions and motivations of others (Parris, 2008; WHO, 2017, Johnson et al., 2009; US Department of Health and Human Services, 2018). During the adolescent period, the prefrontal cortex continues to change and mature, not reaching full development until approximately age 25–30 (Johnson et al., 2009; Lebel and Beaulieu, 2011). Until this process is complete, adolescents may have difficulty evaluating situations, identifying and weighing options, and selecting the most appropriate course of action for the situation at hand (Parris, 2008; Johnson et al., 2009). Adolescents are also more likely to react impulsively and emotionally to certain situations as the emotional centers of the brain dominate the underdeveloped neurons of the PFC (Parris, 2008). Emotional and affective development in adolescence are discussed in the next section of this paper.

To understand adolescent brain development, it is also important to explore the concepts of myelination and pruning. Myelination is the process where the nerve cells of the brain become insulated with a layer of fat, which helps nerve impulses to move more quickly and efficiently (Parris, 2008). The adolescent period is a pivotal time in brain development, as the brain is working hard to reorganize itself to identify its priorities. During adolescence, neurons that are not often used do not go through the process of myelination, and are therefore lost or “pruned” (Parris, 2008). This process allows the brain to focus on strengthening and reinforcing the cognitive processes deemed to be the most important to each individual (Feinstein, 2009). According to Spear (2013), “synaptic pruning [is the] hallmark of brain transformations of adolescence, with a loss of close to 50% of the synaptic connections in some regions” (p.2). This provides some important considerations for teaching and learning in nursing, as there is an opportunity to train the brain to focus on the executive functions needed to practice safely and efficiently. Evidence would suggest that the concepts taught in the first two years of the program could set the stage for what knowledge and skill is retained moving forward in the program and thereafter.

2.3. Emotional & affective development

Adolescence is a time for a great deal of social and emotional exploration and experimentation. During this developmental stage of life, youth are beginning to develop their self-concept through their experiences in life and in school (Feinstein, 2009). Adolescents' lives are frequently fraught with paradox, such as their dependence on others for emotional support while simultaneously searching for emotional autonomy; their tendency to be self-absorbed at the same time they are exploring altruism and caring for others; their risk-taking, impulsive behaviours slowly being replaced by measured thought and rational decision-making (Feinstein, 2009). Though these processes are commensurate with the learning goals embedded in novice nursing education, they are far from complete.

Students learn early on in their program that one of the most important parts of establishing a therapeutic relationship with their clients is knowing themselves. Understanding the influence one has on a nurse-client interaction is critical, and if students are so deeply entrenched in the process of discovering who they are and what they stand for, the interaction will be difficult to navigate. If their experiences with

difficult or overwhelming client interactions are negative, these experiences will be interpreted as such and will begin to exert a negative impact on their self-concept as a nursing student.

The amygdala is responsible for unconscious, instinctual actions like the ‘fight or flight’ response, while the prefrontal cortex (PFC) is responsible for the executive functions of the brain. [Feinstein \(2009\)](#) writes that adults use their PFC for information processing and organization along with other executive functions. Adolescents PFCs are immature and ‘under construction’ during this phase of development, so the amygdala does most of the work instead ([US Department of Health and Human Services, 2018](#)). This explains the emotional outbursts and extreme reactions to seemingly innocuous situations that are common in the adolescent population, and symptoms of their still-developing emotional regulation system ([Krettenhauer et al., 2014](#); [Matthews et al., 2016](#), [Turpyn et al., 2015](#)). More importantly for nursing, teens’ reliance on the amygdala interferes with their ability to process certain types of information the way an adult would. Confusion around the interpretation of socially relevant stimuli, such as facial expressions ([Fossati, 2012](#)) may cause them to misread, and even miscommunicate, another person’s feelings ([Bergen et al., 2018](#); [Feinstein, 2009](#); [Killgore and Yurgelun-Todd, 2006](#)). Research by [Konrath et al. \(2011\)](#) found that college-aged students demonstrated difficulty with empathy and seeing things from another person’s perspective, both of which are prized components of the therapeutic nurse-client relationship.

In nursing, being observant and sensitive to detail when interacting with clients is essential. After all, picking up on cues of all kinds from clients and using those cues to inquire, assess, and intervene, is what nurses do best. The inability to interpret another person’s verbal and non-verbal cues, combined with in-progress emotional regulation abilities has important implications for communication. For example, young people will often feel an emotion long before they have found a way to articulate it, which can leave them struggling to find socially appropriate ways to express themselves ([Feinstein, 2009](#)). Students’ egocentrism during this stage of development leads them to confuse their own thoughts with those of others. This leads to feelings of self-consciousness, particularly fears of being ridiculed or judged ([Feinstein, 2009](#)), further complicating their ability to communicate effectively with others.

2.4. Theoretical perspectives

Educators in the nursing program strive to link theory to practice as often as they can, to provide students with rationale and context for practice. It is also important for nursing educators to consider how theory informs both teaching and learning across an undergraduate program. There are many learning theories out there today that guide educational approaches and initiatives, and often a combination of several different theories are used to guide teaching.

When considering the developmental stage of students entering the nursing program, it is important to explore and integrate multiple different learning theories into practice. For example, behavioural theorists such as John Watson or B.F. Skinner postulated that certain behaviours are more likely to continue when they are rewarded, or reinforced, with the threat of being “lost” when focus is taken away ([Merriam and Bierema, 2014](#)). These theories fall in line with the “use it or lose it” considerations discussed earlier, as the large majority of myelination and pruning happens during adolescence ([Parris, 2008](#); [Feinstein, 2009](#); [Spear, 2013](#)). The literature also suggests that adolescents are reward-driven individuals ([Feinstein, 2009](#); [Davidow et al., 2016](#)), which may provide us with some insight into how we can adapt course feedback and evaluation methods. The [American Psychological Association \(2015\)](#) suggests that stage of development does not impose limitations on students’ learning provided certain conditions related to previous experience exist. They do however acknowledge that when the context of learning and the associated knowledge domain are unfamiliar, students’ reasoning capacity is less sophisticated. For nursing

students, this is of particular importance as the majority of students do not enter their program already prepared with nursing-specific knowledge, nor are they generally familiar with the context of learning involving, for example, physical assessments on their peers and standardized patients.

In addition to behavioural theory, social cognitive theory also provides some important considerations for teaching adolescent nursing students. Albert Bandura discusses the role of observation and role modelling for learning, which are both used often in nursing education. According to [Bandura \(1971\)](#), “most of the behaviours that people display are learned, either deliberately or inadvertently, through the influence of example” (p. 5). This opinion is supported by neuroscience, as neurons have been discovered to fire vicariously in response to another person’s behaviour or actions ([Iacoboni, 2008](#); [Sylwester, 2007](#)). This knowledge may help to identify effective teaching methods for first and second-year nursing students in laboratory and simulation contexts.

The line between them may be blurry, but there are fundamental differences between adolescents and adults in terms of their behaviour and brain development, particularly problem-solving and decision-making ([US Department of Health and Human Services, 2018](#)). Simply, adults and adolescents are in different positions in the lifespan and therefore experience differences in social roles including level of dependence, accumulation and nature of life experiences, and developmental process ([Merriam & Bierema, 2014](#)). Malcolm Knowles’ work on adult learning theory nearly four decades ago informs many of the practices still used today to engage adults in the teaching learning process. One of the most significant differences between adult learning principles and the ways in which adolescents learn is in the notion that adults are, and need to be, self-directed in their pursuits. This comes from the assumption that adults are independent and ‘know what they do not know’ so to speak. Conversely, adolescents are still in a predominantly dependent state and, in the context of nursing education, ‘do not know what they do not know.’ This makes learning theories such as cognitivism and constructivism inappropriate with this population as generating meaning from the knowledge constructed through unfamiliarity with that body of knowledge makes little sense. What does make sense across both populations is the assertion that readiness to learn is tied to the individual’s developmental task at hand and social role as these are both flexible and context-relevant for all learners ([Merriam & Bierema, 2014](#)).

If, in theory, adulthood is defined as the mastery of 3 stages: acceptance of responsibility, independent decision-making, and financial independence ([Arnett, 2014](#)), then it can reasonably be argued that the majority of adolescents are still very much in transition. The emphases placed on responsibility for self and for clients, coupled with the notion of independent decision-making complicates the expectations of novice nursing students who may not be fully prepared to take on the burden of this responsibility as it exists in all aspects of nursing practice and education.

3. Discussion

Transitions can be difficult during all stages of life, and the transition from high school to post-secondary pursuits is no exception. Educational transitions are among the numerous developmental tasks of adolescence, and are associated with significant increases in psychological, social, and intellectual vulnerability ([Druinveld et al., 2017](#)).

How an adolescent deals with transitional change depends on many different factors that are shaped by broader social, cultural, and biological constraints ([Druinveld et al., 2017](#)). Academics aside, ‘emerging adulthood’ is new life stage defined by higher levels of stress and anxiety, and greater incidence of serious mental disorders and student reports of feeling overwhelmed and under-prepared than ever before ([Merriam & Bierema, 2015](#); [Mental Health Commission of Canada, 2017](#)). The American Psychological Association [APA] states that the

teenage brain is more vulnerable to stress than that of the adult, and that nearly 60% of older adolescents reported feeling stressed every day (APA, 2015).

Novice undergraduate students entering programs directly from high school may be functioning independently from their parents for the first time. They may find themselves responsible for things like their own finances, part-time work, cooking, doing their homework, living with roommates, negotiating romantic relationships, getting to sleep, waking up on time, getting to class, and so on. As such, it is imperative that educators attend to more than just students' academic needs (Willinsky, 2015).

Adolescence is a time of transition for young people and educators are responsible for more than just the academic success of our students. Parallel to their scholarly studies, students are learning to manage their lives and find their own place in the world. They are finding their identity, forming new relationships, and continuing to develop their emotional regulation skills. Emotions are complex systems of response to a variety of physiological, experiential, and expressive stimuli (Turpyn et al., 2015). Nowhere is such a complex interplay of stimuli more explosive than in the teenage brain. Strategies for teaching and learning need to acknowledge these in-progress developmental processes as they are directly related to students' learning educational performance (APA, 2015) and overall well-being. Special attention must also be paid to the mental health and wellness of these young nursing students, as mental health challenges in this age group are becoming more and more prevalent each year (CMHO, 2017). As the onset and prevalence of depression and anxiety is the highest in adolescence and young adulthood (Findlay, 2017), it is imperative that support and accommodation is provided to those students who are in need.

4. Implications and conclusion

Some important questions need investigation to be sure that educators' expectations of students are appropriate for their developmental stage. The delineation between adult and adolescent is important, but this distinction should not be our main focus. The implications of questions about adolescent brain science, the developmental process, generational influences, and program and faculty expectations are important considerations when planning and developing nursing program curricula.

Significant research has been conducted on the novice learner in undergraduate nursing education, but less is known about the nursing student who is also in the adolescent stage of development. There is also no guarantee that all students will have achieved a certain level of mastery over many of the developmental tasks of youth, despite the expectations of undergraduate curricula by the time they arrive in nursing school. The specialized body of knowledge in nursing, including complex sciences, relational concepts, and sophisticated interpersonal skills, consistently present significant challenges for adolescent students entering nursing programs.

This paper is not intended to be disparaging of students' abilities/inabilities, nor is it intended to be critical of nursing programs or the faculty teaching within them. Greater understanding of novice nursing students as adolescent learners will lead to improved curricula, more effective teaching and learning strategies in the classroom, and will hopefully improve professional engagement and behaviour. Changes to nursing curricula do not necessarily need to involve adding or removing content from the program. Nursing educators may wish to consider reorganizing content to better suit the adolescent learner. For example, educators may wish to introduce more sophisticated concepts later in the nursing program, focusing more on basic foundational concepts earlier on. Though this may be disruptive to existing curricula, program tradition, and involves a great deal of effort and time, it may be the answer to improving the teaching and learning experience. Appropriate expectations of students will hopefully lead to better learning

experiences and may also help to mitigate the burden of anxiety and other common mental health challenges during this time in the students' lives.

This paper presents an idea that warrants further exploration and study due to its applicability to nursing education in Canada and across the globe. It is the authors' hope that future study of this topic will provide valuable insight into ways in which nursing curricula can be better aligned with the adolescent developmental process.

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