

The development of a medicines management module for undergraduate nursing students

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Abstract

Nursing students find pharmacology and medicines management a very challenging aspect of their undergraduate learning. To address this, we have developed a module that incorporates a number of interlocking features: flipped lectures with exercises, regular formative assessments, team-based activities, weekly Q&A sessions and a simulation exercise; these are conducted over a 7-week period at the end of their 3rd year. Student performance in the module has been very good, and student feedback has been very positive. We believe that the combination of pedagogical modalities have made a significant contribution to the success of the module and we will continue to develop the module, to further enhance the student learning experience

Keywords: Medication management; Pharmacology; dosage calculations; large classes

1. Introduction

The safe management and administration of medicines is a key skill for nurses. It requires a knowledge of how medicines work (pharmacology), coupled with skills in calculating dosages of medications (drug calculations) that are situated within the context of the nursing environment of patient care. As a consequence, the development of these skills is attempted within the undergraduate curriculum but often has not been successfully embedded upon graduation (Gill et al., 2019). The Bachelor of Nursing Science is a 4-year programme of study at the University of Galway, which was introduced across Ireland in 2002 to replace the hospital-based education training approach that existed up until that time. Students are taught within the first three years of the programme by a combination of theory (University-based) and clinical practice (hospital-based). Until relatively recently, the subjects of Pharmacology and medication management were taught in separate parts of the curriculum, but there was a growing awareness of the intersections of these areas that could be more valuable to incorporate into a single module. This paper provides an overview of how we have developed a medicines management

module at the University of Galway, using a complementary range of pedagogical strategies that will be useful in a variety of settings across the healthcare sector and beyond.

2. Description of the Teaching/Learning Context

The class typically consists of approximately 120 students, drawn from 3 subgroups, namely General Nursing (63% in AY 2023-2024), Mental Health (20%) and Midwifery (17%). The module (NU3105: Medicines and Clinical Practice) is delivered over a 7-week period immediately following a clinical placement in the first half of the semester. The module lies at a pivotal juncture, positioned at the point before students embark on their final year of the programme which largely consists of an internship where practice skills are honed.

The inaugural year when the module was introduced was AY 2020-2021, at the peak of the COVID-19 pandemic when all instruction took place online. On return to on-campus teaching, we preserved some of the elements of online instruction to produce a blended teaching approach, with self-directed learning being a key component. In the few short years since its inception, the module has gone through considerable evolution, driven by discussions amongst the teaching team and student feedback. The main features of the module are summarised in Table 1. The series of interlocking features includes “equipping” lectures, team-based exercises and assignments, a weekly online Q&A session and a simulation session.

Table 1. The main features of NU3105 (Medicines and Clinical Practice)

●	A 1 hour “equipping” lecture in each week
●	A 2-hour in-class interactive session each week
●	An assessment at the end of each unit
●	Team-based assignments (continuous assessment)
●	A weekly Q&A with the Module Lead
●	A simulation session
●	An end of semester assessment

Figure 1 describes the composition of the module in 3 units, which takes the student on a journey from the theoretical underpinning of Pharmacology (Unit 1), its application in the pharmacological treatment of a range of diseases (Unit 2), and finally to the management of medications (Unit 3).

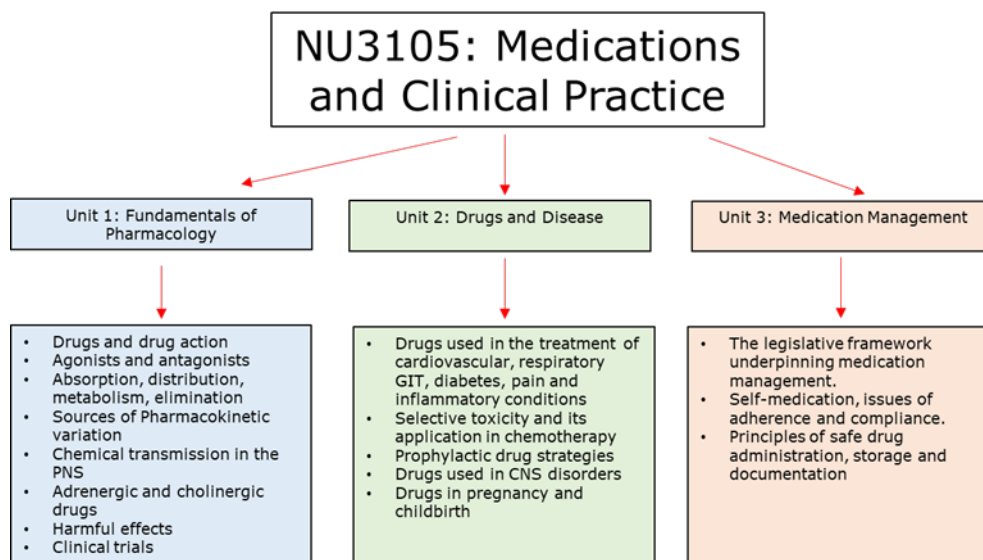


Figure 1. The composition of each unit of NU3105

During our first on-campus session, we ask students a range of questions using the Vevox polling software (Golden, 2023). Such icebreaker questions are an opportunity to reduce the apprehension that students might have and to create a welcoming environment (Frisby and Martin, 2010). They include questions that ask about the students' background, expectations and acknowledging the diversity of challenges that students face in pursuing a full-time programme of study. Towards the end of the session, the questions become more focused on the module itself asking about drugs and conditions that the students would like to learn more about. These types of questions have been asked at introductory pharmacology classes for a number of years and have helped to shape the content of the module. For example, when the fundamentals of pharmacology are described, we draw on the most common responses, such as painkilling medications. These questions also enable the specialist groups of students to have a voice and so medications and conditions employed in midwifery and mental health are featured.

Table 2. Questions posed at the introductory session

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|-----|--|
| 1. | Which group do you belong to (General, Midwifery, Mental Health)? |
| 2. | Michael is suffering from an attack of wheezing. He takes his prescribed inhaler and within minutes his symptoms improve. How do you think that the inhaler worked to produce this effect? |
| 3. | What do you think are the main goals of a University education? |
| 4. | How do you learn something new? |
| 5. | What are your expectations of this module? |
| 6. | What prior learning do you think will help you succeed with this module? |
| 7. | What do you see as the principal role of a Lecturer? |
| 8. | What do you see as the principal role of a Student? |
| 9. | In consideration of ALL of your modules, how many hours EACH WEEK do you plan to spend this Semester? |
| 10. | What is your average commute time to the University? |
| 11. | What will be the average number of hours each week that you intend working (either paid or caring duties) outside of my studies? |
| 12. | Have both, one or neither of your parents obtained a bachelor's degree? |
| 13. | Is English your first language? |
| 14. | What are your expectations for inclusivity (i.e. an equitable, welcoming environment)? |
| 15. | Write down 3 drugs you would like to learn more about |
| 16. | Write down 3 diseases/conditions that you have encountered in your clinical experience that you would like to learn more about |
| 17. | Write down an example of a drug effect on the body (e.g. adrenaline increases heart rate) |
| 18. | Write down a "drug story" that you'd like to learn more about |
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The students are also provided with a Handbook that provides all of the relevant information regarding the module, including the recommended student effort for each week (Table 3). These are based on the module having 10 ECTS, which typically equates to 250 hours of student effort (European Commission, 2015), which we have reduced to 200 hours to take into consideration the shortened period that the module runs over.

Table 3. Recommended contact hours for each week of the module

Week	Synchronous sessions (h)	Self-study (h)	Team-based activities (h)	Total effort (h)
Week 1	4	16		20
Week 2	4	16		20
Week 3	4	9	7	20
Week 4	4	9	7	20
Week 5	4	9	7	20
Week 6	6	7	7	20
Week 7		13	7	20
Reading Week		30		30
Assessment Week		30		30
Totals	26	139	35	200

At the end of the introductory session, the students are divided into teams of 5 of a similar specialty and are asked to sit together for any subsequent on-campus sessions providing the students with a map of the room. The weekly Exercise sessions consist of a series of questions that focus on certain aspects of the content that the students have been able to access using the online resources (Figure 2), and a representative of each team posts their answers using the Vevox polling software.

1. John is feeling light-headed.....

John (Aged 60) has had his blood pressure taken; 140 mm Hg systolic or at least 90 mm Hg diastolic

1. How would you classify John's blood pressure?
2. What would be the goal of therapy for John?
3. Identify the classes of drugs that can be used to treat hypertension
4. Which drug treatment would you recommend for John



Figure 2. An example of the team-based questions asked during the Exercise sessions

3. Key features of the module

Students access the learning resources at the beginning of each unit via Canvas (the University's learning management system). This is the lecture content that has been converted into an online interactive resources using the Articulate Rise 360 e-learning platform. Initially, only the first 2 units were in this format (i.e. the pharmacology content), but in advance of AY 2023-2024, we converted the third unit into the same format. Thus, the students experienced a consistency of

delivery across the entire module, with an equipping lecture at the beginning of each week where the principal learning challenges would be highlighted that would be followed by the on-campus exercise session later in the week.

In our conversations as a teaching team, we acknowledged that there are a range of features associated with medication management. We came up with the idea of a “threaded case” where all of the teaching contributors could apply to their topic. We created a case that would be recognizable in some features to all 3 of our student cohorts. The case that we decided upon was: *“Mary is 32 years old who is 30 weeks pregnant, has a history of type 1 diabetes (diagnosed at age 13) and depression (diagnosed at age 24). Mary has presented with a urinary tract infection (UTI)”*. This case enables us to the pharmacology of the drugs, medication risk management, legislation regarding administration of medications, drug calculations, safe drug administration and documentation amongst other features.

Working in teams that we have incorporated into the exercises sessions is a key skill for students in healthcare to develop and can be incorporated into a large class environment (Burgess et al., 2020). To encourage team participation, the students sign a contract which outlines their obligations as a team member for the module. Working together in the earlier weeks is developed further during the 3rd week, when the teams are provided with an assignment that consists of creating a case that revolves around a patient (for example a Parkinson’s Disease patient) from which they can draw on their clinical placement experience to produce a recorded PowerPoint presentation. In addition, they produce a drugs fact sheet geared towards the patient.

In the latter stages of the module, students receive a simulations session which serves as a capstone activity where all the features can be applied. Simulations are a very valuable training opportunity where students can make decisions about medication management in a safe and supportive environment (Koukourikis et al., 2021).

Continuous assessment amounts to 30% of the module mark (15% team-based assignments and 3 x 5% for interim assessments). The end of semester assessment consists of 60 questions, mostly MCQs, with a small number that require calculations and the entering of numerical values.

4. Findings

The average mark for the module was 66% (min 44 – max 89%). On completion of the module, we conducted a paper-based survey. Overall, the feedback has been very positive, with a high level of agreement on most of the Likert-type statements (Figure 3).

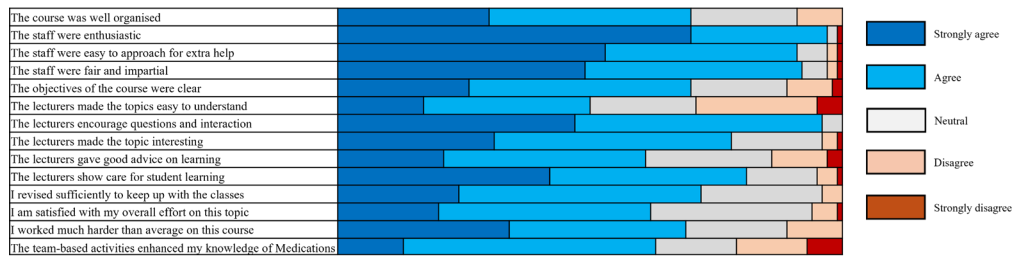


Figure 3. The responses to structured feedback questions in AY 2023-2024 for NU3105, conducted at the end of the teaching period, and prior to the end of semester assessment; 116 students out of a class of 118 (98%) completed the survey.

Aspects that students particularly liked were the degree of interaction, drug calculations, team-based activities, regular assessments, and its relevance to practice (Table 4). The most common suggestion for improvement was the provision of more in-class lectures, more resources particularly for drug calculations, for the module time period to be extended and more content relating to the specialties of the nursing cohort.

Table 4. Main themes identified from free text responses

How much time did you spend/week? 17 hours

What did you like most?

Interactive and Engaging Lectures (34 mentions); Drug Calculations and Medication Knowledge (21 mentions); Team-Based and Collaborative Activities (16 mentions); Continuous Assessments and MCQs (15 mentions); Relevance to Practice and Practical Applications (14 mentions)

What could be improved upon?

More in-Class Teaching (46 mentions); More support on drug calculations (22 mentions); More time for the module (16 mentions); Additional Practice Materials and Resources (13 mentions); More tailoring of content to specific nursing disciplines, e.g. Midwifery and Mental Health (11 mentions)

5. Reflection

The components that currently make up our medication management module have been developed to maximize student engagement and active learning. The module has evolved to its current configuration by means of a series of steps, one of the most challenging of which has been the blended teaching approach, that takes adjustment on the part of students as it is not embedded elsewhere in their studies. As this approach is not widely embedded elsewhere in the degree programme, it necessitated additional support, communication and scaffolding to ensure all participants were confident in navigating the new learning environment.

Another difficulty in implementing the module was aligning the assessment design with professional standards and programme-level learning outcomes within the limited timeframe available (7 weeks). This required strategic planning to ensure that students could engage meaningfully with the material and demonstrate deep learning without being overwhelmed. Additionally, accommodating diverse prior learning experiences, both from university coursework and clinical placements, proved complex in terms of content delivery and assessment fairness. Despite these challenges, the module effectively builds upon students' prior learning, and creates opportunities to consolidate and apply this knowledge meaningfully. While the condensed timeframe of presents constraints in terms of depth and pacing, student performance and feedback suggest that the overall approach is effective. Nevertheless, these challenges have underscored the need for continued refinement, particularly in enhancing the integration of blended learning and ensuring alignment with the wider nursing curriculum.

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