Discipline-specific knowledge and capabilities

Communication skills

Digital literacy

Critical thinking

Problem solving

Self-management

Teamwork

Global citizenship

ABSTRACT

Having discipline specific knowledge and capabilities appropriate to the level of study related to a discipline or profession is one of Deakin University's eight Graduate Learning Outcomes.

Possessing discipline specific knowledge and capabilities associated with one's degree is crucial in order for graduates to have a firm foundation in their future chosen profession.

The following information is set out in order to assist academics at Deakin to teach and assess discipline specific knowledge and capabilities.

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DISCIPLINE-SPECIFIC KNOWLEDGE AND CAPABILITIES?

What is discipline-specific knowledge?

Discipline specific knowledge can be defined as a set of understandings that is more than broad knowledge of a field, rather, it is the sort of knowledge that is specific to the discipline or profession and defines a specialist in the area.

Why is discipline-specific knowledge important for students?

In order to pursue employment within a given profession and that requires university education, individuals are required to have foundational knowledge within that particular. Universities are required to ensure that discipline specific knowledge taught aligns with Australian Qualifications Framework (AQF) guidelines, meet the requirement set out by the Tertiary Education Quality and Standards Agency (TEQSA) and discipline specific accreditation bodies (e.g., Australian Medical Council in the case of medicine).

Teaching discipline-specific knowledge

Pedagogy is defined as the method and practice of teaching. Epistemology or the theory of knowledge is the imparting of knowledge and skills. The utilisation of these aspects of learning encompasses the teaching of discipline-specific knowledge. By providing both aspects of learning, the academic ensures that discipline-specific knowledge can be effectively conveyed. How this is done is up to the academic and will be based upon a number of requirements, such as the knowledge itself, what learning environment would best suit the teaching of that knowledge and what resources are to be used in the process.

LEARNING ENVIRONMENTS

There are many forms by which students can obtain discipline-specific knowledge. Typical learning environments can be:

- Lectures
- Tutorials
- Laboratories / demonstrations
- Simulations
- Work integrated learning (Placements / practicums)

Some of these learning environments can be premium located (i.e., face-to-face) or cloud located (i.e., online). For example, tutorials can be conducted in a classroom and/or via online means such as eLive.

There are advantages and disadvantages associated with teaching in particular learning environments (see table 1). For example, lectures have the advantage of a teacher being able to convey a large amount of knowledge to a large audience in one given point in time in one location. However, at the same time lectures have the disadvantage in that students often take a very passive role, which is not very conducive to learning.

Learning environment	Advantages	Disadvantages
Lecture	• can convey a lot of content knowledge • can teach a large class • can easily be recorded	• passive learning • limited opportunity to ask questions • students have a limited attention span to take up information • often theory heavy • difficult for teacher to establish whether students understand throughout lecture
Tutorial	• active learning • suitable for individual and team work • difficult to record premium located tutorials	• not suitable for large classes and thus multiple laboratories need to be held for large cohorts • difficult to run if students do not actively participate or are not adequately prepared (e.g., completion of prior readings)
Laboratories / demonstrations	• elements of active and passive learning • hands on learning opportunities • difficult to record premium located laboratories	• can be time consuming • require resources which can be expensive • not suitable for large classes and thus multiple laboratories need to be held for large cohorts
Simulations	• can simulate real world situations • students can make mistakes without life threatening consequences (i.e., can learn in a physically safe environment)	• in not the real thing but close to it
Work integrated learning (placements / practicums)	• authentic learning environment representing the real world	• if students make mistakes then they can have real consequences (e.g., physically / life threatening)

Table 1: Advantages and disadvantages of learning environments

Teachers should carefully consider what sort of learning environment they use in order to teach discipline specific knowledge based on information such as, but not limited to,:

- students' level of experience - e.g., medical students in the formative years may wish to practice taking a medical history first in a tutorial setting with peers, then in a simulated environment using simulated (i.e., pretend) patients, before permitting them to undertake learning in clinical placement with real patients in a healthcare facility during their clinical years.
- what information is to be taught and learnt
- what learning setting should be used and why (e.g., why use lectures, tutorials etc) and how to select suitable medium for teaching
- class size - e.g., small classes lend themselves well to class discussions and student presentations.

To assist students with their learning they are often directly provided with resources or instructed to seek out resources. Resources used can be used include, but are not limited to the following:

- Online (e.g., Google scholar) and Electronic (e.g., resources, online journals, subject specific mobile phone apps, e-books, e-portfolio, blogs, wikis)
- Readers

Cloud concepts

Academics may also wish to construct cloud concepts which are brief videos located on the cloud that cover a particular concept. Students can then view these within their own time. For more information on cloud concepts please refer to the website resource "From lectures to cloud concepts" http://www.deakin.edu.au/learning/course-enhancements- sandpits/from-lectures-to-cloud-concepts.

Who does the teaching?

Faculty staff members (e.g., lectures, tutors, laboratory demonstrators etc.) are predominantly involved in teaching students knowledge content. However, students can be taught by a variety of individuals. The following individuals may assist students in learning:

Students

Students can be involved in teaching other students in a process known as near peer teaching which is also referred to as peer-assisted learning, peer tutoring, and peer assessment (Ten Cate & During, 2007a). Peer teaching can involve students teaching other students within their own year group (also known as same-age, same-level teaching; Krych et al., 2005). Students can also be taught by other students one or more years senior to themselves, a teaching practice known as cross-age and cross-level teaching (Ten Cate & During, 2007a). The group size of students that are taught can also vary by ranging from one student teaching a single other student to one student teaching a large group of students (Ten Cate & During, 2007a). Students teaching other students can take place in an informal setting such as students teaching each other outside of formal class time or it can be a formal activity such as a student leading a formal compulsory tutorial group (Ten Cate & During, 2007a).

Previous research has shown that peer medical student teachers can be just as effective, and sometimes even more so, at teaching clinical skills than academics (Tolsgaard, 2007). There are many advantages to students being taught by fellow students such that the student in the teaching role having a more similar knowledge base to the student in the learning role compared to that of an expert in the field and thus there is less cognitive distance between the teacher and the learner therefore facilitating the teaching and learning process (Ten Cate & During, 2007b). See Ten, Cate and During (2007b) for a comprehensive review of the benefits of near peer teaching: http://informahealthcare.com/doi/pdf/10.1080/01421590701606799

Deakin offers a structured approach to peer learning through it's Peer Assisted Study Sessions (PASS) to assist students in every faculty. These study sessions are designed to be fun and interactive and are lead by an individual that recently complete the unit. Information regarding PASS can be found at:http://www.deakin.edu.au/current-students/study-support/study-skills/pass/index.php

Placement staff

Students can also be taught by individuals when they complete placements. For example, medical students can learn from various healthcare professions while completing placements at various medical facilities. Whereas education students can learn from mentor teachers while on school placements.

Patients / Clients

Some individuals are not directly employed to teach students such as patients and clients. However, these individuals also provide a valuable teaching resource for students. For example, medical students greatly benefit from interactions with real patients in terms of improving their ability to take a medical history and performing physical examinations as they can directly obtain feedback from the patient and thus gain an understanding from the patient's perspective. Thus it is important to encourage patients to participate in these teaching opportunities in addition to encouraging them to provide students with feedback.

ASSESSING DISCIPLINE-SPECIFIC KNOWLEDGE AND RUBRICS

How to assess

Discipline specific knowledge can be assessed via formative assessments (i.e. assessments FOR learning) and summative assessments (i.e., assessment OF learning). Irrespective of the assessment type, all assessments should be valid, reliable and fair (Campbell, 2011). There are many forms of assessments. We have outlined some of these below:

Multiple Choice Questionnaire (MCQ)

Multiple Choice Questionnaires or MCQs require students to select a single correct answer amongst distractors are commonly used for high stakes exams undertaken by a large number of students (Campbell, 2011). MCQs appear to be easy to write, however, if they are not written well then these questions are a poor discriminator between well performing and less well performing students (Campbell, 2011). These types of assessment questions consist of a stem followed by a set of options from which students need to select the correct answer amongst the distractors (see Campbell, 2011 for an example http://onlinelibrary.wiley.com/doi/10.1111/j.1440-1754.2011.02115.x/pdf).

Students can easily complete MCQs if they are not written correctly- e.g., if options do not make grammatical sense with the stem or options are of differing lengths then these cues can easily guide students in terms of selecting the correct response. Thus general rules need to be followed in order to create well constructed quality MCQs. Some of these rules include:

- ensuring the stem makes grammatical sense with options
- presenting options in alphabetical, numerical or a logical order
- ensuring all options are of approximately equal length
- avoiding "all of the above" / "none of the above"
- avoiding unnecessary words / information
- ensuring that there is one answer only

Please refer to Haladyna et al. (2002) for an extensive list of rules for writing MCQs.

Extended matching multiple choice questions (EMQ)

EMQs provide an alternative to free written responses (e.g., short answer or essay questions) and traditional multiple choice questions containing a stem and asking students to select the correct option (Wilson & Case, 1993). EMQs are more discriminating between high and low performing students than MCQs (Campbell, 2011). These types of questions often consist of:

- a set of eight to ten options (e.g., a list of potential diagnoses in the case of medical student examinations)
- a lead in statement / question informing the student on what they should do (e.g., a statement saying that the following scenarios are all related to children presenting with a particular medical condition and that they need to select the most likely agent from the options for each case based on the scenario)
- two to three scenarios/stems based around a common theme (e.g., scenarios regarding hypothetical patients' signs and symptoms)

For examples of extended matching multiple choice questions see:

- http://www.icoexams.org/assets/user/doc/downloads/Sample_Extended_Matching_Questions.pdf
- http://scholar.lib.vt.edu/ejournals/JVME/V20-3/wilson.html
- http://onlinelibrary.wiley.com/doi/10.1111/j.1440-1754.2011.02115.x/pdf

EMQs are extensively used in the health and science disciplines. For example, EMQs in medical student examinations assess students clinical reasoning abilities as opposed to factual recall by being able to identify a correct answer amongst distractors in MCQ exams.

True / False

True / False style questions require students to indicate whether a statement is true or false. Similar to standard MCQs, these types of questions often test recognition. Like MCQs and EMQs these types of questions can be marked objectively and are suitable for units consisting of high enrolment numbers. However, like MCQs and EMQs they do not enable students to display their knowledge through their own creativity.

Labelling diagrams

Within some disciplines it is essential that students have knowledge of various parts and/or structures and thus diagrams needing to be labelled are often used in assessment questions. This is quite common in disciplines assessing anatomical knowledge. When using diagrams ensure that they meet the following criteria:

- are visually clear / of an appropriate size
- lines / arrows clearly point to the part to be labeled
- are suitable for students that are colour blind (if coloured diagrams are used)

Short answer

Short answer questions require students to write a response to a question. These responses are usually a word or two up to a few sentences in length. A rigorous marking key is required to ensure that answers are marked as objectively as possible.

Essay

Essay questions appear to be easy to write. However, be mindful not to create a question that is too broad or may appear as if the student will need to guess what the marker is thinking. A rigorous marking key should be created for an essay question so than essays can be marked as objectively as possible.

Practical / clinical examination

Within some disciplines it is important to assess students practical knowledge as this closely reflects what students will be required to do within their future profession. For example, medical students will need to be able to take a medical history and conduct a clinical examination. Thus these students are often assessed via an Objective Structured Clinical Examination (OSCE).

The ePortfolio

Eportfolios enable students to document their learning and share components of their eportfolio with others (e.g., fellow students, assessors, future employers). Students can be as creative with their eportfolio as they like by using a variety of tools e.g., audiovisual files, documents, graphics just to name a few. Academics can assess student's knowledge through asking students to create an eportfolio and sharing it with them. Further information on using eportfolios at Deakin can be found at: http://www.deakin.edu.au/teaching-learning/dso/what-is/eportfolio/index.php

Items to consider when setting quizzes

Prior to an end of unit examination some academics like to give students a few quiz style questions throughout the teaching of the unit so that students can practice prior to the exam and so that they have some sort of feedback in regards to their performance. There are a few items that should be kept in mind when setting quizzes:

- frequency of quizzes
- duration of quiz
- formative (and how feedback is provided) or summative
- length of quiz
- types of questions (e.g. MCQ)
- weighting of questions
- closed book vs open book
- located vs cloud.

Items to consider when setting a traditional exam

When setting a traditional exam there are a number of items that should be considered such as but not limited to:

- duration of exam (e.g., 2 / 3 hrs) in relation to number of questions / weighting of questions
- closed book vs open book
- located vs cloud
- weighting of individual questions within the exam
- weighting of exam
- composition of question types within the exam (e.g., 60 multiple choice, 10 short answer questions)
- questions asked in relation to CLOs
- marking key.

General points that should be noted for all written assessments

- avoid culturally biased questions - i.e., questions that are not equitable across different cultural groups http://search.proquest.com/docview/220154732/13CEAD8B91C8EA2E1C/9?accountid=10445
- avoid structurally biased questions - i.e., questions that contain unnecessay words or “noise” http://search.proquest.com/docview/220154732/13CEAD8B91C8EA2E1C/9?accountid=10445
- avoid linguistically biased questions - i.e., questions that are not easily understood http://search.proquest.com/docview/220154732/13CEAD8B91C8EA2E1C/9?accountid=10445

Aspects to consider when assessing students’ knowledge

Academics must keep in mind that for students within a lot of disciplines traditional styles of assessments such as exams (e.g., MCQs) and writing essays do not reflect what students need to do in the real world. Thus it is important to reimagine assessment by creating assessments that reflect what students need to do in the workplace. For example, medical students would need to be able to interact with patients thus assessments could focus on assessing students interacting with a patient in a real clinical situation under supervision. Education students would need to be able to teach school children thus assessments should focus on assessing them at their school practicums. If it is not possible to assess students within a real workplace setting then it may be possible to use simulations. Simulations are often used within the health sciences as this permits students to make mistakes without any real consequences such as endangering the lives of a patients, fellow healthcare professionals and/or themselves. Given that learning does not stop once a student graduates, students should learn skills associated with reflective practice (please refer to the self-management resource sheet), peer and self-assessment (please refer to the self -management resource sheet) and means of evidencing their own learning such as the use of e-portfolios, blogs and wikis.

Tips and suggestions that can ease student anxiety associated with public speaking are presented in Table 2 and are discussed further in **Griffith University: Oral Communication Tool Kit**. Although these specifically focus on public speaking, they could also be applied to decreasing anxiety with any form of oral communication.

Who should assess?

Within the context of assessment academics must decide who should assess. Currently at Deakin faculty tend to predominate in terms of who is doing the assessing (this was shown in the Course Evidence Portfolio for courses that entered the sandpit in 2012).

Here are some individuals, other than faculty academics, that could be involved in assessing:

- peers (i.e., peer assessment)
- the student themselves (e.g., self-assessment)
- clinicians / placement supervisors
- patients.

Calibrated Peer Review

Calibrated Peer Review (CPR) is a tool that may be useful to academics wishing to use peer and self-assessment. Within CPR student will firstly need to learn the standards of assessing via "marking" hypothetical three essays (a low, medium and a high mark) set by an academic. Once students have learned how to assess they will be randomly allocated three anonymous assessments from their peers to mark in addition to needing to self- assess.

As part of healthcare students clinical skills training, patients can also provide students with constructive feedback on their questioning and technique. Thus opportunities to involve patients within the assessment process (even if this is on a formative nature) should not be missed.

FURTHER RESOURCES

Rubrics

Guides on constructing and using marking rubrics can be located on the following Deakin websites:

http://www.deakin.edu.au/itl/pd/tl-modules/assessment/rubrics/index.php

http://www.deakin.edu.au/itl/dso/exemplars/exemp-files/hurst.php

http://www.deakin.edu.au/itl/pd/tl-modules/assessment/rubrics/level-1-descriptors.php

http://www.deakin.edu.au/itl/pd/tl-modules/assessment/rubrics/level-2-descriptors.php

http://www.deakin.edu.au/itl/pd/tl-modules/assessment/rubrics/level-3-descriptors.php

http://www.deakin.edu.au/teaching-learning/dso/guides/d2l-grades-rubrics.php

Useful links

Australian Qualifications Framework (AQF) http://www.aqf.edu.au/

Tertiary Education Quality and Standards Agency (TEQSA) http://www.teqsa.gov.au/

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