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FEATURE

You Will Learn It Or I Will Teach You

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ABSTRACT - Higher education has experienced a paradigm shift away from teaching and toward learning. This focuses on students, and defines learning as "significant long-term changes in knowledge, understanding, skills and attitudes or beliefs." This focus calls for androgogy — adult education — which focuses on collaboration, inquiry, and self-direction. Principles of this new learning focus include active learning, focus on the learner, ensuring links between new and previously learned knowledge, effective feedback, and scaffolding to help learners organize learning experiences. Problem Based Learning (PBL) is one approach which responds to this change in focus. Examples are given of how the University of Newcastle has addressed this new focus in their curriculum, graduate profiles, and evaluations.

Within the title of this presentation I have tried to capture the paradigm shift in current tertiary education thinking. Once the quality of an academic's teaching was the primary consideration, quality often measured in the quantity of content imparted. Now the shift in focus is to *what the students are learning*. We as academics should be shifting our thinking from what we do when we present sessions to students, to focus on the learning experience the student will have as a result of our teaching. This would include the knowledge skills and perhaps even values or attitudes that our students will have as a result of their learning. As teachers we must become focused on student learning.

The role of the teacher, when focused on student learning, is crucial but not in the traditional sense. The teaching activities that we now need to focus on are the creation of an engaging learning environment, providing the learning stimulus, supporting the learner, and providing effective feedback on the learner's progress. This is truly a paradigm shift for many university teachers in Australia, and I suspect elsewhere.

What is Learning?

The shift to student learning as the primary focus of the teaching activity is appropriate, but to do this we must appreciate the complexity of the learning activity. There exist three primary learning theories which provide insight as to how we learn. These include developmental theories of learning, behaviorist theories of learning, and constructivist theories of learning.

The constructivist theories and the associated "personal construct" theory are the most recent. The constructivist theories provide the basis for much of the considerations of learning at the tertiary level at this time. Rather than delve into the psychological learning theories, however, let us look at what learning means to us as tertiary teachers. Table 1 documents the characteristics of the models of learning.

Table 1
Characteristics of Models of Learning

	Developmental	**Behaviorist**	**Constructivist**
Focus of teaching	Learning for knowing	Learning for doing	Learning for being
Knowledge produced	Propositional	Practical	Experimental
Curriculum structure	Disciplines	Crafts	Issues
Teaching style	Exposition	Demonstrations	Facilitation
Role of teacher	Expert (source of knowledge)	Master (skilled technician)	Collaboration
Teaching strategies	Lectures based on theory	Practical demonstrations	Participative
Research style	Experimental	Applied	Action/participative
Research goal	Abstract general knowledge	Solutions to workplace problems	Change of theory

The shift to the constructivist mode of teaching would be the most appropriate considering the focus on learning. A simple definition of learning would state: Learning is an active, interactive process which results in *significant long-term changes* in knowledge, understanding, skills and attitudes or beliefs.

The three important terms are "significant, long-term, and changes." *Significant* can be considered as the learner having an appreciation and understanding of the content, not simply a rote-learned knowledge. This would entail the student having a working knowledge or the ability to apply and relate what is learned. The concept of *long-term* knowledge relates to the knowledge existing beyond the examination period: the knowledge is a working knowledge that provides the basis for further learning and application. Finally, changes mean not only the taking on board of the information but the integration of that knowledge with other knowledge. Integration of knowledge learned is critical to it effective use.

Pedagogy vs. Androgogy

The implications of this shift toward meaningful learning is that the traditional view of the teacher as the pedagogue would be replaced by that of the teacher practicing androgogy.

The concept of androgogy is drawn from the biological concept of *androgynous*. The basic non-biologist's explanation of this concept is that of plants having the ability to reproduce within themselves. The term, as applied to the practice of teaching, is seen as the shift from the teacher as the "giver of knowledge" to the student having the internal capacity to generate knowledge. The students that come to us at university have already acquired many of the tools and capacities for learning, e.g. reading, communicating, interacting and problem solving.

A course based on the conceptual framework of androgogy has very different attributes from one which focuses on pedagogy. These differences are summarized in the Table 2.

Principles of Good Teaching

In trying to change the focus of my own teaching to that of considering the student as the learner, I have changed many things I do in the classroom and the laboratory. Below is a summary of some of the principles I have been guided by. Also provided are a number of examples of some of the practices and projects I have been involved in to support the focus of student learning. The considerations are:

1. Learning must be active.
2. Focusing the learner through the relevance of the content.
3. Developing clear objectives to provide direction to student learning.
4. Articulate knowledge and learning experiences, ensure the links between learning components.

Table 2

Differences between Pedagogy and Androgogy

Course Elements	**Pedagogy**	**Androgogy**
Self-concept	Dependency	Increase Self-directedness
Experience	Of little worth	Learners are a rich source of learning
Time Perspective	Postponed application	Immediacy of application
Orientation to Learning	Subject centered	Problem centered
Classroom Climate	· authority oriented · Formal · Competitive	· Mutuality · Respectful · Collaborative
Planning	By teacher	Mechanism for mutual planning
Diagnosis of student needs	By teacher	Mutual self diagnosis
Formulation of Objectives	By teacher	Mutual negotiation
Curriculum Design	· Logic of the subject matter · Content units	· Sequenced in terms of readiness · Problem units
Activities	Transmittal Techniques	Inquiry
Evaluation	By teacher	Mutual self evaluation of needs

5. Ensure the application of effective feedback mechanisms to ensure the formative phase of learning and match the assessment to the type of learning experience.
6. Employ effective "scaffolding" in the organization of the learning experiences.

Active Learning

Students do more when they are actively involved in the learning process. The activity occurs as a result of the student employing both physical and mental energy in the learning. This would mean that the practice of sitting in lectures, and to a lesser extent tutorials, is not as effective as providing them with more student involved processes.

I have for many years now employed the teaching methodologies of Problem Based Learning (PBL) and Project Centered Learning, a less widely used strategy.

What is PBL? PBL is a structured teaching approach that often starts with a simulation of a real life situation from which a "problem" can be identified. The use of a real life situation engages the learner in the context and they are facilitated toward identifying and meeting their own learning needs in relation to the situation. Students then reapply their learning to the presented situation. Other terms that are sometimes used to describe PBL approaches are *Situation Based Learning, Inquiry Based Learning* and *Context Rich Learning*.

The focus of PBL is on the student's learning rather than on the more traditional modes of teaching which focus on the professor's teaching. A major principle of PBL is that students will work collaboratively; it is through learning groups that students are provided with the opportunity to communicate what they have learned and how this contributes to the development of the group's learning outcomes. Working in groups provides an opportunity to develop and enhance students' collaborative problem solving skills, including communication skills.

The advantages of PBL over other forms of teaching. PBL could be considered a value-added approach to teaching. For example, in PBL approaches, students acquire lifelong learning, communication, critical thinking and decision-making skills because of the nature of the learning they are engaged in. PBL approaches also encourage students to acquire course content but they acquire this through an active process where the exploration of a real life situation directs learning. This shows that students have the opportunity to benefit greatly from the learning experience provided by PBL.

PBL Example. The PBL methodology has the potential to be a most valuable means of teaching technology at all levels. The outcome of the implementation of this strategy has been very positive despite some initial student concerns over their expectation of the role of the professor and their role as the student.

The course was offered to students in the fourth year of the B.Ed. Design and Technology Program. The subject introduced students to the context of solar energy applications. Students were informed about the PBL methodology at the beginning of the semester to ensure that they understood the process and what experiences they were likely to confront during the project. Students selected their own group members, on professor's advice as to the criteria to follow. The students were exposed to a wide range of information and media about solar energy and its current applications.

The context of solar energy applications was presented to students by the professor. Students, using group process, specified a specific problem to be addressed by the project. Some of the other features of the project were

1. Students worked in groups of four. This group size allowed for high levels of individual involvement but also provided experiences in the function and organization of group work.
2. Student groups undertook preliminary research in the field of solar energy application. Materials provided by the professors (e.g. videos) initiated and supplemented student research.
3. Student groups identified a potential area of interest in solar energy application and undertook in-depth research into this application in order to develop a design opportunity.
4. Student groups organized their approach to solving the problem.
5. Student groups undertook the development of a working prototype which fulfilled the developed design brief.
6. Student groups documented research, the input of individual group members, and prototype design and development.
7. Students evaluated their group's prototype as well as the process used to achieve the outcome. The students' learning experience while participating in the project was also evaluated.

What is Project-Centered Learning? This methodology of project centered learning differs in its characteristics from the widely accepted and published PBL Methodology. The project-centered learning activity involves a single student rather than group as in PBL. Also the project is identified and the objectives for the project are developed by the professor, though it must be considered that the flexible outcomes strategy does provide some student-centeredness to this mode. This methodology involves the student receiving the specific project with the expected outcomes and the assessment criteria profiled, or with a degree of flexibility in the weighting.

This strategy is used in the development of specific skills as well as providing a diversity of contextual situations the student is exposed to. I use this methodology more in the first two years of the program, giving way to the more student-centered activities in the latter part of the program. This strategy of decreasing the professor centered learning in favor of student-centered learning as the course progresses alleviates some of the concerns students have with taking the responsibility for their own learning. Even at the initial stages of the program the student-centered learning mode is still dominant.

An important aspect of this method is the introduction of the specific project. It is important that students experience the process of design and problem solving from a range of different contextual situations as well as starting on the process from different points of the design phase. As they work through to the completion of the project, students keep a record of the development of the project through the use of a folio. An aspect of the project is that the student must provide documentation of their reflections on the project, process and outcomes, this activity supports the metacognitive phase of the learning process essential to the ability of the student to be able to transfer skills to different technological situations.

Focusing the learner through the relevance of the content

This is one of the most difficult and often overlooked aspects of university teaching and course structures. I will use the example of engineering programs. Often students do courses which are considered “foundation courses,” e.g. math or physics. It is expected that the students will need these skills to have the capacity to confront engineering problems later in their program. The trouble with this approach is that many students simply learn the math and when they come to applying it later in their program, it invariably requires re-teaching. In conducting focus reviews with student, when evaluating programs, the statement often made by students completing first year was “I have completed 25% of my program and I still do not know what an engineer does.”

To address this situation requires professors to take the time to locate the content they are teaching within the context of the profession which students are being prepared for. Embedding content within its application increases the relevance of the content to the student, which has the effect of reinforcing their learning.

Developing clear objectives to provide direction to student learning

The concept of core skills and competencies in tertiary education has long been identified as an issue. Professions require graduates to be able to display a range of attributes appropriate to their profession. The discipline of engineering also identifies the need for graduate competencies to be developed. The process of integrating these competencies into engineering curricula has been taking place over a period of time, as seen in our Computer Engineering Graduate Profile:

Students graduating with a Bachelor of Computer Engineering degree from the University of Newcastle should have the following attributes:

- Be conversant and practiced in engineering project and design skills.
- Have fundamental knowledge of mathematics and physics.
- Have knowledge and ability to apply fundamentals of computing, communications and electrical systems.
- Have advanced technical skills in several of the streams relevant to computer engineering, including some advanced work in software, computer hardware and computer architecture.
- Have an awareness of the basic economic, management, legal, industrial and ethical responsibilities of professional engineers.
- Have the ability to communicate well with others using written, spoken and graphical presentation techniques.
- Be able to use research, computer aided design and analytical skills in a structured way to solve engineering problems.
- Have experience in, and motivation for, self-directed learning.
- Be able to participate in and contribute to teams engaged in a variety of engineering activities.

There still remains the issue of how students relate to these skills. Moreover, do they recognize their acquisition of these skills and do they realize their value to their own professional career development?

The University of Newcastle is currently investigating methodologies for supporting the delivery, development and assessment of core skills which reflect the unique profile of our graduates. The need to develop and record undergraduates' core and vocational skills is acknowledged within The University of Newcastle. The project Newcastle University Recording Academic Professional and Individual Development (NURAPID), currently being implemented, proposes transferable processes whereby these skills will be promoted, developed and recorded. This will be achieved through the implementation of a web-based skills development and recording system within three programs; Building, Education and Nursing. These disciplines were chosen because of the existence of a well-defined and documented set of professional competencies which are applied in the accreditation of graduates.

The project targets the University's core skills but will also address other skills categories (including personal/professional and technical skills) and align these with the skills and competencies required by relevant professional institutions. The outcome for students will be personal documentation of the evolution of their achievement of their skills and competencies.

The overall outcomes of the project include:

- The embedding of a culture of lifelong learning for the cohorts involved.
- The articulation of transferable methodologies for the implementation of electronic portfolios and skills development.
- The provision of a generic core skills recording and development system for The University of Newcastle.

Following are the core skills of the University of Newcastle:

Graduates of The University of Newcastle will have demonstrated that they are able to:

a. Operate effectively with comprehensive and well-founded knowledge, skills and ethical standards appropriate to their fields of study.

b. Acquire, organize and present information.

c. Reflect on and continue to develop their knowledge, skills and attitudes.

d Think logically, laterally, critically and creatively; analyze and synthesize.

e. Act effectively in decision-making and problem-solving.

f. Carry out research activities.

g. Communicate effectively as members of their communities.

h. Work autonomously and collaboratively.

i. Utilize information technology appropriately and competently.

j. Seek improvement in organizational, social and cultural contexts, in an ethical manner.

k. Recognize social, cultural, physical and intellectual diversity, including the history and diversity of Australian indigenous peoples.

l. Recognize and respond appropriately to globalization and other changes of context.

m. Recognize human impact on the environment, and its implications for environmental sustainability.

Linking to Programs

When programs are reviewed or developed it is a requirement of the University that the qualities of the graduates are defined as a "graduate profile." Following is an example for a master's program in engineering:

1. In-depth technical competence in at least one engineering discipline,
2. Sufficient breadth and depth of knowledge of engineering sciences to enable understanding of the scientific and engineering contexts of current and future development in at least one engineering discipline,
3. Be able to use research and analytical skills in a structured way to solve engineering problems,
4. Ability to appropriately select and assess the value of information and methods used to effectively identify, formulate and solve engineering problems,
5. Ability to critically appraise and justify the validity of solutions to engineering problems,
6. The ability to communicate well with others using written, spoken and graphical presentation techniques,
7. Ability to undertake problem identification, formulation and solution.

These competencies are then demonstrated to align with the University's core skills, as demonstrated in Table 3.

As courses are developed, each of the course objectives is related back to the program graduate profile then each assessment item is aligned with the course objectives. This curriculum activity supports the development of courses and programs that have clearly defined graduate attributes which have been assessed.

Articulate knowledge and learning experiences, ensure the links between learning components

The more meaningful and appropriate connections students make between what they know and what they are learning, the better the retention they will have of the new information. The relationship in the students' minds between the new information and the old information will be considerably stronger, ensuring that the newly learned material will be usable more quickly and effectively. This requires the teacher to be developing the links between the information and developing the relationships between domains. This is readily achieved through the extensive use of examples, illustrations, descriptions, images, metaphors, and analogies.

Table 3
Core Skill/Objective

Core Skill/Objective	1	2	3	4	5	6	7
· Operate effectively with comprehensive and well-founded knowledge, skills and ethical standards appropriate to their fields of study.	x						
· Acquire, organize ad present information.						x	
· Reflect on and continue to develop their knowledge, skills and attitudes.	x	x			x		
· Think logically, laterally, critically and creatively; analyze and synthesize.	x			x			
· Act effectively in decision-making and problem-solving.				x	x		x
· Carry out research activities.			x	x			
· Communicate effectively as members of their communities.						x	
· Work autonomously and collaboratively.						x	
· Utilize information technology appropriate and competently.					x	x	

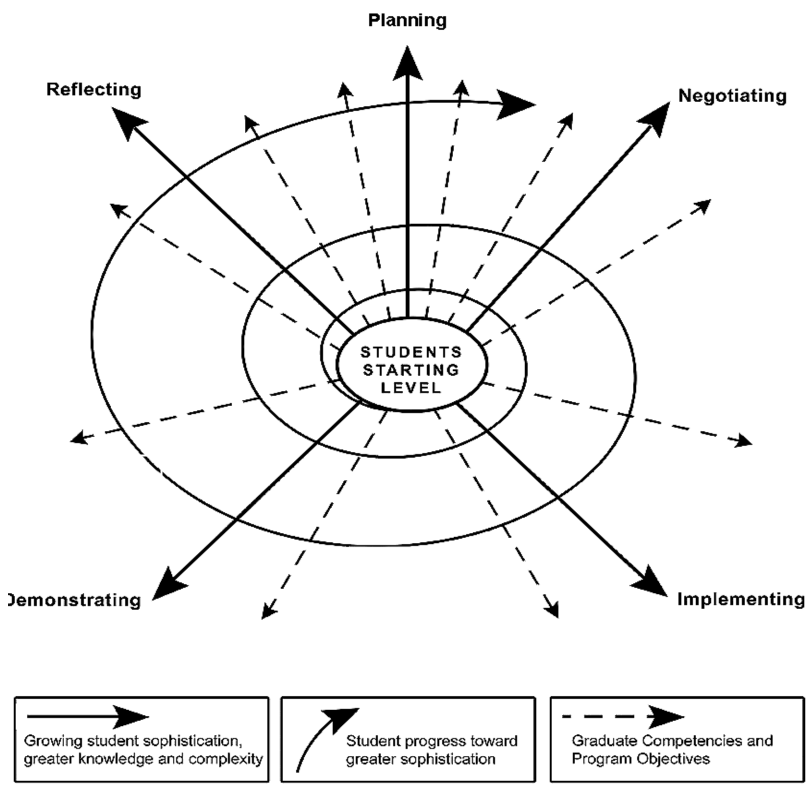
This development of associations between new knowledge and learning extends to the development of curriculum at both the micro and macro levels, courses and programs. The linking can best be represented in the Figure 1.

The benefits would be achieved through the concept of continuously revisiting the learning objectives and relating progress to them, subsequently reinforcing the learning experience. This looping process is demonstrated in Figure 1, which not only illustrates the phases of the context, but extends the concept to demonstrate the "growth" of the learner in these phases as they participate in this learning process.

Demonstrating Growth

Figure 1 demonstrates how students are provided with the opportunity to extend their learning capabilities while progressing through the curriculum. This

Figure 1
The Learning Capability Spiral



is demonstrated in the growth in sophistication of the student across five learning domains which include:

Demonstrating. Students, through the process of presenting their ideas and concepts, enhance their skills at presenting, oral and written communication and self and peer assessment.

Reflecting. Students reflect on their conceptual development. Their understanding and knowledge about the context is enhanced through the process of problem reformulation.

Planning. The processes of target setting, scheduling and creativity are regularly reinforced through decision-making and problem formation.

Implementing. The ability to organize the components of a problem and implement the strategies are continuously developed.

Negotiation. The ability to communicate concepts and ideas to other participants with the purpose of creating a shared understanding and purpose is supported.

Ensure the application of effective feedback mechanisms to ensure the formative phase of learning and match the assessment to the type of learning experience

As with the teaching strategies I employ in my classes, I use a wide range of assessment strategies to achieve the desired positive learning environment. It is critical that I have both aspects of assessment, formative and summative, to support student learning. I develop assessment which is based on the 3 R:

1. **R**espect for students as part of the learning process
2. **R**elevance of what is assessed in relation to what the students are doing
3. **R**esponsibility of the students for their own learning

The variety of assessment mechanisms used includes:

- Criterion based assessment
- Outcomes based assessment
- Ipsative assessment
- Peer assessment
- Student self assessment

Criterion Based Assessment. Criterion Based Assessment provides the flexible assessment strategy appropriate to the diversity of activity involved in student centered learning. I have the philosophy that assessment is a tool for gathering information about the student (achievements, capabilities and potentials), about the learning process, and about the effectiveness of teaching. It can also be one of the most powerful instructional tools in creating a learning environment that is both stimulating and effective. The development of student understanding of assessment requirements is achieved through well-developed assessment criteria. This in turn provides for a shared understanding by the students and myself, essential to positive assessment practice.

Outcome based assessment. An outcome based curriculum can be particularly effective in the field of technology education. It allows for the desired outcomes of learning to be achieved through a variety of paths. These paths can be tailored to the individual needs and interests of the students involved. The outcomes to which a learning program is aimed can be clearly stated to the students, so they know what they are expected to learn from the unit of work they undertake. As the outcomes can be achieved at different levels, so the students can be involved in the process of the evaluation and assessment of their work.

This type of assessment strategy is most valuable with the learning strategy of mastery skills. The specific skills identified, most often through negotiation with the students, are set as the outcomes to be achieved. Students work at these skills until a desired level of skill or outcome is achieved. It is possible through the documentation and compilation of these achieved skills that a student is able to show a profile of skills or competencies. It is important for students to see their knowledge and skill development profile in terms of their professional development.

Ipsative assessment. Ipsative assessment measures the student's performance in relation to how that same student performed at an earlier time, without reference to either external standards or to other learners - it maps growth and development in a non-competitive, positive framework. This assessment methodology may not necessarily contribute to the marks of a student but as a formative assessment paradigm it is very powerful as it provides me with an ongoing record of the student’s skills, knowledge and performance profile. This is essential when negotiating tasks with individual students. Students should be guided from an informed position: I keep records of students’ prior negotiated learning contracts and use these in discussions with students to guide them as they map out their next learning phase. Students should be encouraged to achieve not only depth of study, but in the case of technology, should be encouraged to achieve diversity both contextually and technologically.

Peer assessment. Involves the students participating in the evaluation of each to reinforce the nature of the assessed learning outcomes or objectives. This strategy also helps all students to learn about the variability of the assessment process. This assessment methodology has proved most valuable in group or collaborative learning methodologies. Peer collaboration (and even more, teamwork) is used extensively in my teaching activities to simulate the characteristic way in which design and technology operates in the real world. In order to maintain a sense of fairness when allocating marks to members of the group, several options may be used. Identical marks to all members of the group places the responsibility for the organization and the distribution of the work on members of the group. Alternately, the group may internally agree to a particular pattern for the distribution of the marks, through peer assessment techniques. I use this strategy at the conclusion of an assessment task. The students maintain a record of all meetings in the form of "minutes" or "agendas." The students document the ongoing development of their groups work through recording distribution of tasks and the subsequent reporting on task outcomes at mandatory group meetings. Students at the conclusion of the work are asked to reflect on the activity to evaluate the performance of the group members. This evaluation is taken down and recorded as a grade. The peer performance grade combined with the meeting minutes provides a sound understanding of the performance of each of the individual team members. This strategy allows me to distribute grades more fairly in the context of group work.

Student Self Assessment. I have used this assessment strategy primarily in the learning contracts methodology. This strategy reinforces the metacognitive phase of learning technology. Encouraging a student to reflect on the process they have just completed and to evaluate it against the established objectives encourages students to look closely at what they set out to achieve and how they went about achieving it. This is vitally important in the context of technology education as it provides the student with a better understanding of the processes and will assist in the transferability of problem solving strategies and skills.

I have found that after the initial introduction of this strategy, students tend to do the reflective aspects of the process within their documentation so that the need to mandate them to provide a self-evaluation becomes superfluous.

Many of the teaching methodologies I use have projects or problems as their center. To be effective, the feedback provided to students needs to be comprehensive. Assessment criteria are developed to both guide the student and provide the assessment framework, which in turn must be aligned with the learning objectives. This must be done by the teacher in the case of a more teacher-centered course, or developed through collaboration between the teacher and the student in a learning contract-based course.

I have expanded the strategy of criterion based assessment to provide more detailed feedback to students as well as engage them more fully in the assessment activity. This is achieved through providing a comprehensive profile description of the criteria. Students utilize the profile to support their own evaluation of the project outcomes. At the beginning of the assessment task the profile provides a good initiator for discussion about the assessment and the linking of the assessment outcomes with the course objectives. Table 4 is a component of one of the assessment profiles from a Design course.

Table 4
Assessment Criteria and Performance Profile

Demonstrated Attribute Quality	Performance Level Indicator 5	4	3	2	1	Minimal Demonstration of Attributes
Theme analysis provides clear direction to design						Theme analysis is not evidenced
Concept development provides clearly defined design outcomes						No concept development supporting design outcomes
Clear communication of design progress						Communication of design progress is inconsistent
Production processes well defined and documented						Production processes is not defined or documented
Well-developed rationale for materials selection and processing						Non-existent rationale for materials selection and processing
Prototype functions to documented design standards						Prototype does not meet design standards
All signpost signoffs documented						No signpost signoffs

Employ effective "scaffolding" in the organization of the learning experiences

Students have a great deal of difficulty transferring knowledge and skills across context boundaries. This provides a great deal of opportunity for the teacher to develop strategies and projects that will encourage and support the development of this capacity. Following is a project at Newcastle in the Physics School. Students invariably did not enjoy their physics experience and the staff were frustrated that they seemed to be confined to teaching physics in traditional contexts, in turn losing the interest of the students, predominantly engineers. The application of mathematical software to the unit provided professors with the ability to shift their focus from the mathematical skills to the problem solving processes and the application of physics to a diverse range of contexts.

The Physics Projects

Traditional introductory University physics reinforces the division between knowledge and conceptual understanding by emphasizing physics as a "storehouse of knowledge" rather than as a dynamic activity. As such, there is little emphasis on truly modern physics. Deficiencies in the mathematical skills of the students are widely cited as the main hurdle to presenting more complex applications in introductory physics courses.

The core competency that appears to be lacking amongst physics undergraduates at Newcastle is the ability to transfer knowledge gained in one course to another. This concept of "transfer of training" is a well-known topic of study in educational psychology, with literature in the area dating back more than a century. From the point of view of physics education, this transferability appears to occur most readily when students have a good understanding of their subject. At University, students appear to fall into one of three learning style groups:

1. In the *deep approach*, the student strives to understand the subject and to relate it to existing knowledge.
2. In the *surface approach*, the student attempts to memorize rather than understand, with the learning priority being the immediate task rather than the underlying understanding.
3. In the *strategic approach*, the goal is simply to gain the highest possible grade and thus the student focuses upon past papers and grading schemes.

Thus, in order to enhance transferability, any university course should focus upon increasing the number of students using the *deep approach* to learning. However, it would appear that traditional physics courses tend to increase the tendency for students to fall into groups (2) and (3), rather than (1).

Project Aims:

- to develop some new perspectives on particular aspects in physics

- to give students a new set of tools, in this case related to using *Mathematica*, which will help to remove the mathematical complexity of problems, leaving time to probe the physics.

Learning Outcomes:

- Increase student transferability of knowledge and skills in physics.
- Increase student motivation for learning physics.
- Increase the number of contexts which will be addressed in the subject.
- Improve student perceptions of the relevancy to their future career plans.
- Enhance student problem solving skills, especially with regard to complex applications.
- Enhance student understanding of physical concepts and idea. Increase the support of student learning through the use of mathematics software.

What is a Good Teacher?

Let us return to the concept of the teacher. What are the characteristics of a good teacher? The Australian Vice Chancellors, after extensive research, define that good teachers:

- Are themselves good learners
- Display enthusiasm for their subject area
- Recognize the importance of context and adapt their teaching accordingly
- Encourage deep learning approaches and develop students' critical thinking skills, problem solving skills and problem approach behaviors effectiveness of teaching performance
- Fffectiveness of supervision
- Quality of teaching materials
- Effectiveness of assessment techniques
- Availability for responsiveness to students' needs for consultation

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