Enhancing Student Ability to Meet Graduate Outcomes in IT and Beyond

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Wayne Godfrey achieved undergraduate degrees from his home country - Canada - and earned a Masters of Education from USQ in 1998, specializing in curriculum design. He has worked at DMC since 1995 and has been teaching and has led a Foundations Computer course COMP 100 for the bulk of that period.
Introduction

Globally, information technology (IT) advances on a day-by-day basis with developments in functionality and ease of use. As educators it may be considered difficult, if not impossible, to maintain a suitable level of IT literacy ourselves, let alone keep our courses current and assist students. However, perhaps the emphases of any IT course need to be not only the IT literacy itself, the way in which IT can enhance the learning process, especially in the area of developmental education including study and research skills. This would enable students to recognise that they need to upskill technically, and also give them the strategies to seek out relevant information and training.

From consideration of the match between HCT’s Graduate Outcomes (GOs) and the current COMP100 course learning outcomes (see Appendix 1), it is clear that COMP100’s learning outcomes provide some preparation in GO1 and GO4, but not in the other GOs. Therefore, in the Foundations Department at Dubai Men’s College (DMC) there has been a strong initiative to develop an integrated Computer, Research Skills and Projects (CRSP) course to increase the number of supplementary study, research, and higher order thinking skills that students assimilate and apply in their Foundation Year.

A further consideration is that the technical skills demonstrated by each student intake, especially in Dubai and Abu Dhabi, have increased exponentially (Godfrey, 2004: 2006). Research suggests that the computer skills level of the learner should drive the method in which a course is presented. Students with non-existent or elementary skills will require a different pedagogical approach to those with intermediate or advanced skills. This paper therefore outlines the initiatives that have been designed and implemented in the integrated CRSP course at DMC to increase the course’s effectiveness in helping students meet GOs. Results and implications are referred to, and recommendations are made.

Global and local requirements: Pedagogical and curricula reforms

Education is viewed in many societies as expenditure rather than investment (Corr 2007). Furthermore the perceived value of education is undermined by the “mismatch between what is taught and what is required” (HE Maqbool Bin Ali Sultan, 2007) in societies where graduates need to be able to cope with rapid change and shifting requirements. Specifically, students need help to become:

- aware of the connection of what they are learning to the world around them, and the complex interconnections that exist therein;
- knowledgeable about a variety of skills and concepts;
- proficient at using technological tools;
- self-reflective and able to identify training requirements;
- skilled in using inquiry strategies;
- effective in collaborating with others;
- confident in selecting appropriate strategies and skills;
Clearly, developing these qualities would provide a springboard to many of HCT’s graduate outcomes: critical and creative thinking (GO 2), global awareness (GO 3), technological literacy (GO 4), self-management and independent learning (GO 5), and teamwork and leadership (GO 6).

Traditionally in the UAE, teaching and learning have been considered as the transmission of knowledge and the absorption by the learner of an ultimately knowable representation of ‘reality’. Once the information is assimilated, it is then assumed the learner can apply it to authentic contexts outside of the learning environment (Cobb, 1994). However, The Arab Human Development Report (United Nations Development Programme, 2003) revealed that many Arab students (including those in the UAE) “can do little but memorise, recite and perfect rote learning” (54). The report also indicated that the pedagogical methodology in use is largely didactic, teacher-centred and passive, and assessments are used that require memorisation and surface ‘knowledge’. To achieve a paradigm shift that would address these issues, there needs to be unanimous adoption of a student-centred environment incorporating an active learning and teaching approach (Seels & Glasgow, 1998).

**Meeting changing learner needs**

The original COMP100 course and its associated learning outcomes were developed to meet needs that were current and essential. However, the Ministry of Education in the UAE has been revising its educational strategy to comply with international standards, with particular focus on IT skills (UAE Ministry of Information and Culture, 2006). Other initiatives that appear to have increased UAE student knowledge of IT include the IT Education Project (ITEP - launched in 2000), in particular through its associated Web site www.itep.ae (UAE Ministry of Information and Culture, 2005). COMP100 leaders at DMC have identified that many learners are arriving already equipped with skills (see Figure 1 and Figure 2) that are currently taught in the Foundations level COMP100 course (Godfrey, 2006).

![Figure 1: Proportion of computer access, formal computing tuition, and Internet access at DMC](image.png)
The method of delivering a course is affected by the skills that students arrive with (Tsai, 2004). Therefore, in response to changes students entering DMC and other HCT colleges are displaying, it is advisable to adapt curricula and teaching methodology. In particular, it is important to integrate content courses so that students are encouraged to develop multiple representations of ideas while engaging in activities that require them to apply the target concepts and skills (Krajcik et al 1998).

**The COMP100 course**

Software application training has previously been described as “a systematically planned teaching and learning process, the aim of which is to enable users to handle particular functions of an application [sic] software independently” (Bannert, 2000: 336). This approach is reflected in the COMP100 course outline that states:

“Students are introduced to the basic concepts of computing and acquire the skills necessary to use a personal computer...a variety of application programs...[and] the features of Windows based word processors, presentation software and spreadsheets. Operating System concepts are introduced in a Windows environment, as is the use of the Internet. Consistent with the HCT learning model, course delivery includes materials and processes that develop global awareness, self understanding and professional attitudes and practices. The development and recognition of ethical standards is incorporated into the learning process” (Higher Colleges of Technology, 2001).

It could be argued, though, that these course objectives are incomplete and do not emphasise being able to evaluate, select, and apply the functions. Foundations computing courses now need to be less about teaching students the basic skills of using an application, and more about teaching them the problem solving, time management, project planning, and associated study skills that they will require for further study in an IT discipline or in other subjects. This factor is recognised by HCT which indicates that
during the process of helping students to develop cognitive and language skills, it is necessary for “the content and level of materials...[to] move from basic information based tasks towards more complex processing and expression of ideas” (Higher Colleges of Technology 2002 :7).

The Integrated Foundations Program

The Higher Diploma Foundations program at DMC historically comprised four discrete courses: Mathematics, Computing, Arabic and English. Research and study skills were separated into skill focused units and presented as part of each course and through weekly sessions administered by the Learning Centre. Some of the issues with this approach were sparse communication between courses, non-integrated 'projects' that were completed in isolation, assessment overload, and minimal recycling and reinforcement of key skills. As a result, Foundations students were not graduating with the necessary level of study, research or critical thinking skills to study effectively at Higher Diploma level and beyond. Consequently, Foundations faculty at DMC decided to design and implement an integrated approach that incorporated research, study and critical thinking skills in a dynamic interrelationship with the four main HD Foundations courses.

The resulting blended learning course called is Computer, Research Skills and Projects (CRSP) - see Figure 3 below. This course is built around four fully integrated projects completed over the forty-week academic year.

Figure 3: Interdisciplinary, integrated Foundations approach (Moran & Owen, 2007, Adapted from HCT Numeracy Process Model, UAE Ministry of Education, 2005)
Figure 4 below illustrates the mutually supportive dynamic in HD Foundations. The projects recycle processes as well as giving students myriad opportunities to apply concepts and skills from all the courses thereby incorporating “critical thinking and problem solving at a level of complexity appropriate to the level of the…students” (Higher Colleges of Technology, 2001). Every project has at least one aspect that develops the learning outcomes for the other HD Foundation courses, i.e. English, Math, and Arabic, thereby encouraging the transfer of “their learned skills to a variety of contexts that mirror the reality of the workplace and the wider world” (Higher Colleges of Technology, 2002:7).

![Figure 4: Application of skills, concepts and learning strategies (Moran & Owen, 2007)](image)

**Blended learning**

One definition of blended learning is “the effective combination of modes of delivery, models of teaching and styles of learning” (Procter 2003). Students entering HD Foundations are most familiar with didactic, passive learning environments (to the left of Figure 5 below) and therefore require a heavily scaffolded approach to help them cope with the transition into a more student-centred blended learning environment.

![Figure 5: Blended learning continuum in an educational context (Heinze & Procter, 2004)](image)
Blended learning (employed within a framework of sociocultural theory) that uses Information and Communication Technology (ICT) has great potential to enhance learning outcomes (Gross & Wolff, 2001). Waxman, Lin, and Michko (2003) carried out a meta-analysis of recent ICT research projects, and their findings established that “teaching and learning with technology has a small, positive significant effect on student outcomes [including cognitive and affective outcomes] when compared to traditional instruction” (14).

Scaffolding, a central concept of sociocultural theory, includes an essential role for teachers (McLoughlin & Oliver, 1998) because it requires them to create opportunities for learners to interact with tasks, peers, and their community (Hausfather, 1996). As Figure 6 illustrates, supported interaction can create a bridge across the gap (Zone of Proximal Development - ZPD) between a learner’s existing knowledge or skills, and desired educational goals (Owen, Young, Lawrence, & Compton, in press).

Figure 6: Diagrams showing the process of ZPD (Johnson, 2001)

Applying these principles, CRSP utilises two hours per week face-to-face classroom sessions, a one hour per week face-to-face tutorial, synchronous interactions with teachers and peers using MSN, and access to the learning management system WebCT. Alongside a suite of tools that provide scaffolding (see Table 1 below for some examples), documents, models, examples, explanations, instructions, learning outcomes and rubrics are all available on WebCT. A variety of formats and media are used to help meet differing student learning styles: visual, aural, read / write, kinaesthetic, multimodal (Fleming & Bonwell, 1998).
<table>
<thead>
<tr>
<th>Strategy / Tool</th>
<th>Scaffolding / Enhancements provided / Outcome</th>
<th>Skills Developed</th>
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| MSN chat       | o Students communicate with peers & teachers from any location with Internet access  
|                | o Increases access to all teachers  
|                | o Encourages students to refine problem / question before making contact  
|                | o Saved chat history can be accessed later to revisit instructions & answers  
|                | o Empowers students  
|                | o Opportunities to communicate for authentic purposes, & practise range of language functions | o Communication skills  
|                |                                               | o Interpersonal skills |
|                |                                               | o Global awareness |
|                |                                               | o Problem solving |
|                |                                               | o Self-directed learning |
|                |                                               | o Appropriacy of language / formality |
|                |                                               | o Awareness of audience |
|                |                                               | o Life-long learning |
| WebCT (learning management system) | o Provides searchable, central location for communication tools, calendar, quizzes etc, & a place to upload homework / assignments  
|                | o Enables students to consult & retrieve resources 24/7, from anywhere, thus empowering them  
|                | o Enables students who have to travel or be unavoidably absent to keep up with course requirements | o Project management |
|                |                                               | o Empowerment |
|                |                                               | o Self-directed learning |
| Calendar (in LMS) | o Gives students overview of 40-week semester  
|                | o Has reminders of homework required  
|                | o Gives final project deadlines  
|                | o Provides live links from calendar directly to task, rubric, instructions, tool, or explanation referred to in calendar postings | o Time management |
|                |                                               | o Project management |
|                |                                               | o Self-directed learning |
| Late policy - when students submit work - following scheme is applied (see Figure 10) | o Catches students attention where verba or written warning may not  
|                | o Provides opportunities to discuss concept of time management and associated strategies  
|                | o Highlights importance of time management in a study / work environment  
|                | o Demonstrates that work submitted late (without documented reason(s)) has consequences  
|                | o Encourages self-reflection | o Time management  
<p>|                |                                               | o Self-reflection |
|                |                                               | o Awareness of concept of time management |
|                |                                               | o Global awareness |
|                |                                               | o Project planning |
|                |                                               | o Problem solving |
|                |                                               | o Analytical skills |</p>
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| Laptops        | o Allow students to collect and collate original research data outside classrooms  
o Encourages students to be organised (e.g. file naming conventions and file management)  
o Raises global awareness (e.g. security issues such as viruses)  
o Assists students to take responsibility for their own learning (e.g. regular backups) | o Data gathering  
o Organisation  
o Production and presentation of artifacts  
o Communication skills |
| Zero tolerance for plagiarism (mark of 0 given for any incident of copying) | o Catches students attention where a verbal or written warning may not provide opportunities to discuss the concept of plagiarism and its negative effect on learning  
o Raises students awareness that plagiarising has consequences | o Self-reflection  
o Awareness of plagiarism  
o Plagiarism avoidance strategies |
| DMC Learning Center Web site | o Provides support for carrying out on-line searches  
o Gives access to resources (students and teachers)  
o Provides tips on research skills and strategies  
o Allows direct communication with librarians | o Research skills  
o Awareness of reliable resources  
o Plagiarism avoidance strategies |
| Peer assessment / grading / feedback | o Encourages self-reflection and awareness  
o Introduces the conventions for giving constructive feedback  
o Fosters attention to detail  
o Reduces the marking load for teachers (time is focussed on the task rather than grading)  
o Allows more time for face-to-face feedback  
o Raises awareness of appropriacy  
o Encourages multiple revisions | o Analytical skills  
o Language skills (vocabulary and functions)  
o Appropriacy /register  
o Comparison of data  
o Communication skills  
o Interpersonal skills  
o Self reflective skills |
Table 1: Scaffolded tools provided for CRSP learners
(Owen, 2007, adapted from Krajcik et al 1998)

Examples and models are used extensively in the CRSP course to provide students with a clear idea of what the assessment expectations are for each task. For example, in semester one, students are given a model (uploaded to WebCT) for their first presentation, which demonstrates best practice when using PowerPoint slides. By semester two, fewer models are used, and examples are provided which students have the flexibility to adapt and change. The final project has no examples, thus encouraging students to apply all they have learned in the other three projects.

The CRSP Course - Working toward HCT graduate outcomes

The interdisciplinary CRSP Foundations programme requires students to complete a series of assessed and non-assessed tasks set within four key projects: The Country Project, The Famous Person Project, The Career Project, and the Inventions, Developments and Change Project. Students, through a cumulative process, produce one main artifact per project which consists of a variety of elements, including associated computing tasks. The process is experiential and iterative and is designed to help students work towards the HCT
graduate outcomes as represented in Figure 7 below. Students' artifacts are assessed by each of the content instructors, as well as the CRSP instructors, thereby reducing overload while also enhancing the learning process, maximizing opportunities for 'hands-on' activities, and emphasising a sense of purpose.

Ramsden (1992) argues that assessment is about measuring student learning and diagnosing specific misunderstandings in order to help students to learn more effectively. Thus, the CRSP course, rather than relying purely on standardised tests which focus on skills in isolation, uses “alternative assessments that have some value beyond the classroom” (Krajcik et al 1998 :285). CRSP objectives are dynamically related to other disciplines, and as a result of this approach, students develop new understandings about IT and its wider application, as well as considering the specific uses of software applications and how to evaluate the best one for a task. By using critical thinking and decision making skills students are encouraged to transfer and apply them during subsequent years of study as well as in the workplace and the community.

Figure 7: Model of relationship between integrated CRSP course and achievement of HCT graduate outcomes (adapted from Moran & Owen, 2007)

**Evaluation of CRSP**

To enhance the efficacy of the CRSP course, a research study has been conducted which has collected a range of qualitative and quantitative data, while also gathering attitudinal and evaluative feedback. The quantity of data that has been collected, collated, analysed and interpreted is substantial and reference is only made to results
and findings when they bear relevance to COMP100.

Data has been collected in the 2003-2004, 2004-2005, 2005-2006 academic years and semester one of 2006-2007. Study participants were Higher Diploma Foundations students, faculty teaching on the CRSP course, supervisors, and faculty teaching content courses. Data collection tools included interviews, focus groups, surveys, statistics from WebCT, assessments, and documents associated with the CRSP course. By using a combination of research approaches and tools it was felt that the development of computing skills could be studied, while also taking into account improvement in metacognitive strategies.

Findings correspond to the general findings of similar research studies whereby “student achievement is at least as high, and often higher, [than] …in traditional classrooms” (Bossert, 1988-1989: 225). The column headed ‘Some examples - CRSP outcomes' in Appendix 1 clearly illustrates that the increased focus on the study, information literacy, and critical thinking skills has increased the ability of COMP100 to lay the foundations for a larger range of GOs, which can then be built upon once students complete Foundations.

Feedback collected from interviews, focus groups, and surveys with students and faculty can be divided into ten main evaluative statements:

1) Students comprehend the integrated projects in the CRSP course as having real purpose (i.e. adding to skills that they will use in further study and in their careers), while also enhancing their computing skills and heightening awareness of appropriate selection of software applications.

2) Applying concepts and skills learned in core Foundations courses to authentic tasks, coupled with integrated assessment tasks, is motivational and constructive.

3) The production of a diverse range of ‘authentic artifacts' using variety of software applications is stimulating.

4) The integrated CRSP programme approach is effective at fostering research, study, and critical thinking skills acquisition.

5) The skills acquired in HD Foundations CRSP course are being applied by students who graduate to HD.

6) When task completion expectations are high students are ‘challenged' by these expectations and a higher quality of work is produced and submitted.

7) The vast majority of students (93.8%) believe that the CRSP WebCT course is presented professionally and is a good way to supply information, host tools, examples, models, and time-management assistance. In particular, the Camtasia videos are used extensively by the majority (85.4%) of students and faculty.

8) Practical and technical problems can be frustrating but these are accepted as an integral, albeit negative, aspect to using technology.

9) Most students prefer to work in groups, although it depends on the type of task and whether they choose their own group or the teacher allocates group members.

10) A small minority (15.2%) of student prefer to use paper based resources.
Recommendations from stakeholder feedback have been implemented as part of an iterative approach and have therefore resulted in the further incorporation of skills, recycling of key concepts and vocabulary, as well as increased focus on integrated assessment. Furthermore, because CRSP objectives are dynamically related to other disciplines, students have developed new understandings about IT and its wider application, as well as considering the specific uses of software applications and how to evaluate the best one for a task.

Turning to the results achieved by CRSP, Figure 8 below indicates that the pilot year (labeled 2004) had some success. Even though the failure rate increased from the previous academic year, there was a large increase in the achievement of A and B grades. This trend has continued except for the year labeled 2006 where the failure rate has increased. However, this appears to be an anomalous year as the pass rates for English and Math were also low for that cohort.

![Figure 8: Comparison of grades per graduation year (CRSP was introduced in 2003-2004 academic year)](image)

This indicates broadly that the use of strategies and scaffolding such as video is effective in teaching the required technical skills, even though students may be struggling with the language of instruction. Furthermore, through this approach, students gain study and learning skills that will actually assist them with second language acquisition, and perhaps without them the overall CRSP failure rate would have been higher. At the other end of the spectrum, CRSP is effective in extending the more advanced students, keeping them interested and motivated throughout the academic year, even when they have entered Foundations with a high level of technical skills.

One of the problems facing HD Foundations faculty is student reluctance to complete homework or assignments outside of the classroom, and to submit original work on
time. Research carried out in the public school system revealed that homework is rarely assigned to students, or it is assigned with no expectation that it will be completed. In response to this issue, in the 2005-2006 academic year, CRSP faculty implemented a very strict late policy. Moreover, if students copy each other's work on weekly assignments both students receive ‘zero’. There are also certain key assignments where a ‘zero’ grade is awarded if a student completes the work without showing competence in the key teaching point being practiced. The effect of this may be seen in Figure 9 below:

![Results of Zero Tolerance to Plagiarism/Late Policy in CRSP: Change in Student Behaviour (2005-2006)](image)

Figure 9: Improvement of grades in classes where a zero tolerance policy was applied to plagiarised CRSP submissions

Results show that on average students subsequently improve their grade after receiving a zero score 71 % of the time (see Figure 9). Noteworthy is that in the end of year Teacher Evaluation Report, 87% of students from the four sections strongly agreed/agreed that “This teacher is fair when he/she grades my work”. This feedback indicates that students are aware of the purposes behind the policies, especially as participants in focus groups also say that they are aware of plagiarism avoidance strategies and that their time-management skills have improved. Hence, strategies such as the late policy help encourage students to complete and upload work.

The limitations of the data referred to above include issues of reliability, validity and generalisability. Further study is required before dependable recommendations can be made about the effectiveness of integrated programmes. The informal data collected as part of this study, nevertheless, appear promising.
Conclusion

The CRSP course integrates the COMP100 curriculum's objectives and learning outcomes, with the HCT graduate outcomes, in a fluid, flexible course that has been designed for Emirati students and their specific needs as learners (Beare, 2000). Attitude and motivation play a central part in the success of HD Foundations students, and even if a student arrives with a high level of technical skills, this does not guarantee their success in CRSP. Assignments still have to be submitted on time, instructions followed, problems solved, and plagiarism avoided. A high level of experiential, scaffolded, learning with regular feedback helps students to remain motivated, while self-reflective activities raise their awareness of the skills that they are learning and applying. The relevance of both content and skills to current and future learning are emphasised along with future workplace competencies - a process consistently reinforced through realistic examples and tasks. As a result, students are likely to find the transition to tertiary education much smoother, and will benefit even more from courses such as the integrated CRSP course.

The role of the teacher in the CRSP course is less a provider of knowledge, and more of a facilitator and guide. Some students, with their expectations of their own role and that of the teacher, find it extremely challenging to make the adjustment to a more self-directed approach in spite of the heavily scaffolded iterative approach. Nevertheless, ultimately, learners are encouraged to adapt to a new learning culture where research, original production, and creativity are particularly valued.

The CRSP course is subject to regular evaluation which is used to improve and refine it through an ongoing process of research and development. The easily adaptable format means that it has the flexibility to be used in the variety of educational settings within the HCT system, the Gulf region, and possibly at other institutions around the world. The most important factor, however, is that even though it is necessary for students to pass COMP100 to graduate from the college, it is also necessary that the course works toward the HCT graduate outcomes with close reference to government and industry requirements. The blended learning approach is valuable as it provides a supported shift toward self-directed learning that recognises the importance of the training and empowerment of students (HE Sheikh Nahayan Mubarak Al Nahayan, 2007). Consequently, students are more likely to be effective in their course of choice at DMC, but more importantly they are equipped with skills that will help them to be successful in their life after graduation. Perhaps it is the beginning of a shift in focus whereby the skills required for functioning at a tertiary level lead and shape the courses, rather than the other way around.

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### Appendix 1: COMP100: Learning Outcomes - Graduate Outcomes

<table>
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<th>Graduate Outcome</th>
<th>Some examples: COMP100 Learning Outcomes</th>
<th>Some examples: CRSP outcomes</th>
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<tbody>
<tr>
<td>1. Communications &amp; Information Literacy</td>
<td>- Recognize and use common computing terms, at an introductory level</td>
<td>- Searching for information (strategies / methods)</td>
</tr>
<tr>
<td></td>
<td>- Differentiate between software &amp; hardware, operating systems &amp; application programmes</td>
<td>- Recognising problems &amp; requesting assistance by using communication tools</td>
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<tr>
<td></td>
<td>- Demonstrate Internet skills</td>
<td>- Communicating with peers &amp; teachers via MSN &amp; email</td>
</tr>
<tr>
<td></td>
<td>- Use Internet in compliance with ethics of HCT</td>
<td>- Referencing: Why &amp; how</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Awareness of plagiarism</td>
</tr>
<tr>
<td>2. Critical and creative thinking</td>
<td>- Apply referencing of Internet sources as developed in English courses and / or the Learning Centre</td>
<td>- Experiential learning activities &amp; self-reflection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Discussion of use of different tools &amp; strategies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Raising student awareness of critical analysis &amp; higher order thinking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Basic critical analysis of IT concepts</td>
</tr>
<tr>
<td>3. Global awareness and citizenship</td>
<td></td>
<td>- Research/discussion of invention, development or change</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Awareness of impact of IT, globally &amp; locally</td>
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<tr>
<td></td>
<td></td>
<td>- Self-generation of data from a multi-national community.</td>
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<tr>
<td>4. Technological literacy</td>
<td>o Demonstrate correct keyboarding technique&lt;br&gt;o Use Windows operating system to perform disk and file related operations&lt;br&gt;o Use a compression utility&lt;br&gt;o Utilize the Print capabilities&lt;br&gt;o Design and produce documents&lt;br&gt;o Use Templates&lt;br&gt;o Manipulate text and insert elements&lt;br&gt;o Create &amp; modify a table&lt;br&gt;o Create, Modify and Format a Spreadsheet&lt;br&gt;o Produce a PowerPoint presentation</td>
<td>o Use 'scaffolding' to meet task/project requirements&lt;br&gt;o Understand &amp; select appropriately from IT suite&lt;br&gt;Integrated use of:&lt;br&gt;o Web CT as Learning Management System&lt;br&gt;o PowerPoint - presentations&lt;br&gt;o Dreamweaver - Web site creation&lt;br&gt;o MSN - communication &amp; typing&lt;br&gt;o NoodleBib - referencing&lt;br&gt;o Camtasia Studio 3 videos as instruction assistance&lt;br&gt;o Excel - record / collate / present data results&lt;br&gt;o Word - writing &amp; editing</td>
</tr>
<tr>
<td>5. Self-management and independent learning</td>
<td>o Demonstrate basic Internet skills and practices</td>
<td>o Self-analysis of problems&lt;br&gt;o Time management and project planning&lt;br&gt;o Self-check WebCT calendar &amp; meet deadlines&lt;br&gt;o Describing own learning timeframe &amp; style&lt;br&gt;o Awareness of cumulative learning process&lt;br&gt;Recognition of iterative cycle of projects</td>
</tr>
<tr>
<td>6. Teamwork and leadership</td>
<td></td>
<td>o Work as a group on a project / evaluate peers' work&lt;br&gt;o Assign tasks &amp; responsibilities according to strengths&lt;br&gt;o Acquiring awareness of types &amp; contexts of leadership</td>
</tr>
<tr>
<td>7. Vocational competencies</td>
<td></td>
<td>o Understand that underlying strategies are generic &amp; applicable to future vocations&lt;br&gt;o Understand metalanguage and register</td>
</tr>
<tr>
<td>8. Mathematical literacy</td>
<td></td>
<td>o Decision analysis&lt;br&gt;o Use of spreadsheet and databases - integrated projects&lt;br&gt;o Present results from data collection and analysis in oral and written contexts.</td>
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