Adult Basic Education

COMPUTER STUDIES
Advanced Level
Integrated Resource Package

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Adult Basic Education

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Advanced Level

Integrated Resource Package

Province of British Columbia
Ministry of Education, Skills and Training
and the
Centre for Curriculum, Transfer and Technology
1998
Canadian Cataloguing in Publication Data
Main entry under title:
Computer studies advanced level

(Adult basic education)
Includes bibliographical references: p. 34


QA76.27.C65 1998 004'.0715 C97-960331-5

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Adult Basic Education
Computer Studies Advanced Level
Integrated Resource Package
Order number: VA0209

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The Adult Applied Academics Project

The Adult Applied Academics Project (AAAP) was initiated in May, 1995 to revise existing articulated ABE curriculum. Through the AAAP, measurable learning outcomes were identified and approved by the Subject Working Committees. The approved learning outcomes form the basis for the Integrated Resource Packages (IRPs), which also list suggested instructional and assessment strategies and teaching resources for each outcome. The instructional and assessment strategies have an applied orientation.

Applied IRPs have been developed for the following ABE courses: Intermediate Level English and Advanced Level English, Intermediate Level Mathematics and Advanced Level Mathematics, and the advanced levels of Biology, Chemistry, Computer Studies, Physics, and Social Science.

Integrated Resource Package
Applied Academics

Adult Basic Education programs in British Columbia prepare learners for their eventual entry into full-time and rewarding employment. This transition is facilitated by focusing on the applications of concepts and principles to the world of work. Applied Academics, then, presents opportunities to learn in the context of real-world applications. The essential elements of applied academics are:

- outcomes-based curriculum—expressed as observable, measurable, and reportable knowledge, skills and attitudes
- employability skills—inclusion of outcomes or strategies that promote skills that will enable learners to be successful in the workplace (e.g., literacy, numeracy, critical and creative thinking, problem solving, teamwork, technology and information management)
- contextual learning—an emphasis on learning by doing; abstract ideas and concepts, including theories, laws, principles, formulas, rules or proofs, are introduced in a practical context such as the home, workplace, and/or community
- experiential learning—learning that develops supportable and useful abstract ideas and concepts from adults’ life experiences
- interpersonal skills—inclusion of strategies that promote cooperative activities and teamwork
- career development—inclusion of appropriate connections to careers, occupations, entrepreneurship, and the workplace

Applied academics is designed to make learning easy and fun. The following strategic approaches are emphasized in the IRPs and are summarized on the pages that ensue:

Cooperative Learning
Experiential Learning
Project-Based Learning
Problem-Based Learning
Classroom Assessment Techniques

A paper summarizing relevant work on Group Development and Situational Leadership in the classroom, and the Conference Board of Canada’s Employability Skills Profile are included. Implementing innovations such as applied academics is not easy. Some of the “surprises” that may be encountered, and related suggestions for coping with resistance to change are highlighted in the paper entitled, “We Never Said It Would Be Easy.”
Cooperative Learning

What is cooperative learning?

Cooperative learning is a strategy that involves students in established, sustained learning groups or teams. The group work is an integral part of, not an adjunct to, the achievement of the learning goals of the class. Cooperative learning fosters individual accountability in a context of group interdependence, in which students discover information and teach that material to their group and, perhaps, to the class as a whole. The teacher's role changes as Alison King (1993) says “from sage on the stage to guide on the side.” Although they learn in groups, the students are evaluated individually on the learning they have achieved.

Cooperative Learning is structured and focused to make sure that learning is taking place. The teacher chooses the groups to reflect a diversity of viewpoints, abilities, gender, race, and other characteristics. Letting the students choose their own groups can result in a homogeneity, which reduces the acquisition of social skills and increases the possibility of a lack of focus on the learning task (Cooper, 1990).

The groups contain fewer than six students—most likely four. Four is a good number; with more than that, students may not have an equal opportunity to contribute. Four students can work in pairs (each student having three potential partners) or together. The group is large enough to contain a diversity of perspectives, yet small enough to facilitate useful interaction.

Cooperative Learning Creates a Classroom Community, which involves students in a kind of interdependence whereby all are working toward a common goal, often with group members responsible for different aspects of the content and teaching it to other members of the group. The group’s work is not complete until all its members have mastered the content. Furthermore, individual learning is reinforced as a result of explaining the content to others. Once established, the groups can stay together for the entire semester or can be reformed to concentrate or disseminate their acquired knowledge at various stages throughout the semester.

Cooperative Learning Is a Sustained Approach, which lasts longer than a 15-20 minute small-group discussion. An entire course or module may be taught using the cooperative learning method. Because they are in the same group for a longer period of time, students experience greater continuity than in occasional small-group situations. The cooperative method enables the groups to identify areas they need to study further. Groups can recognize connections between what they have learned and what they are discovering, thereby integrating their knowledge. It is important to note that this method encourages students to seek information actively; they are no longer only passive recipients of information.
Cooperative Learning Requires and Enhances Students’ Communication Skills. The success of the group depends upon the interaction of its members. Before cooperative learning can begin, students must learn some of the skills required for successful group interaction:

- paraphrasing others’ words to ensure and verify comprehension
- giving and receiving feedback
- allowing everyone to contribute ideas
- refraining from taking over the group or allowing another to do so

Regular questionnaires can be useful in gauging the success and maintaining the integrity of the group process.

Cooperative Learning Balances Interdependence with Individual Accountability. Instructions to students are specific: each group, and each student within that group, has a task to perform. In other words, each student must demonstrate his or her mastery of the subject and receive an individual grade. Group grades, which may result in some students coasting to a higher mark on the effort of others, do not emphasize individual accountability, and are not recommended.

Cooperative Learning Responds to Classroom Diversity and has a positive impact on students, whose voices may otherwise go unheard in the classroom. These students include women, minorities, and those who for other reasons may be shy to speak in front of the entire class. Those whose learning style preference is cooperative and collaborative, rather than competitive, are also served well by this classroom technique. Let’s face it, most teaching techniques emphasize students working as individuals—either alone in the library, study or classroom or as competitors. Students in the cooperative classroom are responsible for each other’s learning. Competition may still exist; however, it is among groups rather than individuals.
References on Collaborative Groups


Crowley, Mary and Dunn, Ken (1993). *Cooperative Learning at Dalhousie*, a workshop presented at Dalhousie University.


Experiential Learning: Adjusting the Curriculum to Meet the Preferred Learning Styles of your Students

In the course of developing the Adult Applied Academic Project Integrated Resource Packages, David Kolb's Experiential Learning Theory was very informative. Kolb suggests that, to learn, students need to first get information, and then do something with it (process it). Information can be perceived via two extremes—concrete experiencing (CE) or abstract conceptualization (AC). The perceived information-then can be processed either passively (reflective observation, RO) or actively (active experimentation, AE). One's learning style is the product of relative preferences in these learning dimensions. Learning is most efficient when the four modes are used.

Classroom activities can be designed to address all four extremes.

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<table>
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<th>Reflective Observation</th>
<th>Abstract Conceptualization</th>
<th>Active Experimentation</th>
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<td>direct experience</td>
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<td>laboratories</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>lecture examples</td>
</tr>
</tbody>
</table>
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1 by Ted Hougham (thougham@vcc.bc.ca) and Perry Taylor, Vancouver Community College.
In the tables below, Ted (a Dynamic Learner), Perry (an Analytic Learner), Marg (a Common Sense Learner), and Leslie (an Imaginative Learner) are imaginary individuals who each possess a distinctive learning style.

<table>
<thead>
<tr>
<th>Ted likes to...</th>
<th>Ted does not like to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>• have clear information with main ideas first and details later</td>
<td>• read long and complicated instructions</td>
</tr>
<tr>
<td>• have a lot of leeway in how to get to the deadline</td>
<td>• wait before starting a project</td>
</tr>
<tr>
<td>• try things out</td>
<td>• work precisely to a recipe</td>
</tr>
<tr>
<td>• have lots of action</td>
<td>• be trapped in a lecture or a workshop</td>
</tr>
<tr>
<td>• talk while doing things</td>
<td>• follow someone else's agenda</td>
</tr>
<tr>
<td>• work with others</td>
<td>• be condescended to</td>
</tr>
<tr>
<td>• control own learning process</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perry likes to...</th>
<th>Perry does not like to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>• read (but not instructions)</td>
<td>• make decisions</td>
</tr>
<tr>
<td>• explain and write own ideas</td>
<td>• put other people's ideas into practice</td>
</tr>
<tr>
<td>• invent own associations and connections between ideas, materials, etc.</td>
<td>• work with tight schedules and deadlines</td>
</tr>
<tr>
<td>• turn projects into art pieces</td>
<td>• be told how to connect ideas</td>
</tr>
<tr>
<td>• be accepted and liked by others in class</td>
<td>• be scolded for being impractical</td>
</tr>
<tr>
<td>• have lots of talk</td>
<td></td>
</tr>
<tr>
<td>• control own creativity</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Leslie likes to...</th>
<th>Leslie does not like to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>• learn neat new things and then explore them on own</td>
<td>• start work until ready</td>
</tr>
<tr>
<td>• review accepted knowledge first</td>
<td>• spend too much time talking about things</td>
</tr>
<tr>
<td>• get a grasp on the whole before acting</td>
<td>• have too many things on the go at once</td>
</tr>
<tr>
<td>• read detailed texts</td>
<td>• spend time in consensus-building activities</td>
</tr>
<tr>
<td>• listen to lectures, watch video</td>
<td>• discuss mighty ideas with no resolution</td>
</tr>
<tr>
<td>• work with familiar material</td>
<td></td>
</tr>
<tr>
<td>• have time to think</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marg likes to ...</th>
<th>Marg does not like to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>• follow set procedures</td>
<td>• read a lot of impractical theory</td>
</tr>
<tr>
<td>• read a text, listen to a lecture and take notes</td>
<td>• have to figure out what needs to be done</td>
</tr>
<tr>
<td>• get the details right</td>
<td>• spend a lot of time in loose discussion</td>
</tr>
<tr>
<td>• work with clear policies, tasks, plans, and schedules</td>
<td>• act until sure of what is required</td>
</tr>
<tr>
<td>• put principles and policies into effect</td>
<td>• fool around with group and touchy-feely stuff and off-topic materials</td>
</tr>
<tr>
<td>• get the whole picture before starting</td>
<td></td>
</tr>
</tbody>
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**Integrated Resource Package**
Project-Based Learning

What is Project-Based Learning?

In traditional classrooms, learning means reading textbooks, listening to lectures, taking tests, and completing homework assignments using paper and pencil. Project-based learning engages educators and learners in collaborative, constructive, and authentic activities. They have access to timely, dynamic information resources and to members of scientific and professional communities who are shaping our present and future with new discoveries, insight, and knowledge.

Project-based learning has the potential to foster students’ learning and classroom engagement by combining student interest with a variety of challenging, authentic problem-solving tasks.

Features of Project-Based Learning

• Focuses on teaching by engaging students in investigation. Within this framework, students pursue solutions to non-trivial problems by asking and refining questions, debating ideas, making predictions, designing plans and/or experiments, collecting and analysing data, drawing conclusions, communicating their ideas and findings to others, asking new questions, and creating artifacts (e.g., a model, a report, videotape or computer program).

• Requires a question or problem that serves to organize and drive activities.

• Results in a series of artifacts, or products, that culminate in a final product that addresses the driving question.

• Giving students freedom to generate artifacts is critical to their construction of knowledge. Whether the guiding questions and activities are student- or teacher-generated, their outcomes must not be fixed at the outset or students will not have the opportunity to try their own problem-solving approaches.
Benefits of Project-Based Learning

- As students investigate and seek solutions to problems, they acquire an understanding of key principles and concepts.

- Project-based learning places students in realistic, contextualized problem-solving environments.

- Projects serve to build bridges between phenomena in the classroom and real-life experiences; the questions and answers that arise in their daily enterprise are given value and are shown to be open to systematic inquiry.

- Project-based education requires active engagement of student effort over an extended period of time.

- Project-based learning promotes links among subject matter disciplines and presents an expanded, rather than narrow, view of subject matter.

- Projects can increase student interest because they involve students in solving authentic problems and in working with others.

- Projects are adaptable to different types of learners and learning situations.

Today's technologies provide collaboration tools such as real-time video conferences, live-screen sharing, virtual worlds, group chat, Usenet news, and electronic mail. From a technological perspective, this arsenal of collaborative media is historically unprecedented. The challenge for education is to define the place for these new media with regard to the needs of learners. Project-based education enlists these new technologies to facilitate learning.
Problem-Based Learning

What is Problem-Based Learning?

Problem-based learning is learning that is centred around a problem or a puzzle that the learner wishes to solve. More specifically, the term "problem-based learning" tends to be used to describe an approach to curriculum, which is problem-centred, rather than discipline-centred.

Problem-based learning originated in medical schools at Case Western Reserve University in the United States in the 1950s and McMaster University in Canada in the 1960s. The problem-based approach was developed in order to improve the quality of medical education by shifting from a subject and lecture-based curriculum to an integrated curriculum structured by "real life" problems, which crossed traditional discipline boundaries. Problem-based learning is now used world-wide in higher education, in areas such as architecture, computing, engineering, social work, and business.

Using problems as a stimulus for learning is not new and is used by many teachers to encourage student learning (e.g., using case studies in tutorials). A problem-based curriculum, however, is significantly different from the traditional subject-based curriculum. Features of a problem-based curriculum are as follows:

- **Cumulative learning**—a subject is not learned in depth at any one time, but is introduced repeatedly and at increasing levels of complexity during the course of study
- **Integrated learning**—subjects are introduced as they relate to a problem, rather than separately
- **Progression in learning**—what and how students learn changes as students acquire skills and knowledge and as they mature
- **Consistency in learning**—the aims of problem-based learning are reflected in all aspects of teaching and learning, including the learning environment in the classroom and assessment practice

The principles of problem-based learning have elements in common with those of adult learning and lifelong learning; for example,

- students use their existing knowledge in order to learn, rather than being treated as a "blank slate"
- the process of enquiry fosters self-directed learning
- students "learn how to learn" so that they are better able to apply problem solving to new situations in the workplace and in the community
What is Classroom Assessment?

In the 1990's, educational reformers are seeking answers to two fundamental questions: (1) How well are students learning? and (2) How effectively are teachers teaching? Classroom Research and Classroom Assessment respond directly to concerns about better learning, and more effective teaching. Classroom Research was developed to encourage college teachers to become more systematic and sensitive observers of learning as it takes place every day in their classrooms. Classroom Assessment involves student and teachers in the continuous monitoring of students’ learning. It provides faculty with feedback about their effectiveness as teachers, and it gives students a measure of their progress as learners. Most important, because Classroom Assessments are created, administered, and analyzed by teachers themselves on questions of teaching and learning that are important to them, the likelihood that instructors will apply the results of the assessment to their own teaching is greatly enhanced.

Through practice in Classroom Assessment, faculty become better able to understand and promote learning, and increase their ability to help the students themselves become more effective, self-assessing, self-directed learners. Simply put, the central purpose of Classroom Assessment is to empower both teachers and their students to improve the quality of learning in the classroom.

Classroom Assessment is an approach designed to help teachers find out what students are learning in the classroom and how well they are learning it. This approach has the following characteristics:

- **Learner-Centred.** Classroom Assessment focuses the primary attention of teachers and students on observing and improving learning, rather than on observing and improving teaching. Classroom Assessment can provide information to guide teachers and students in making adjustments to improve learning.

- **Teacher-Directed.** Classroom Assessment respects the autonomy, academic freedom, and professional judgement of college faculty. The individual teacher decides what to assess, how to assess, and how to respond to the information gained through the assessment. Also, the teacher is not obliged to share the result of Classroom Assessment with anyone outside the classroom.

- **Mutually Beneficial.** Because it is focused on learning, Classroom Assessment requires the active participation of students. By cooperating in assess-
ment, students reinforce their grasp of the course content and strengthen their own skills at self-assessment. Their motivation is increased when they realize that faculty are interested and invested in their success as learners. Faculty also sharpen their teaching focus by continually asking themselves three questions: “What are the essential skills and knowledge I am trying to teach?” “How can I find out whether students are learning them?” “How can I help students learn better?” As teachers work closely with students to answer these questions, they improve their teaching skills and gain new insights.

- **Formative.** Classroom Assessment’s purpose is to improve the quality of student learning, not to provide evidence for evaluating or grading students. The assessment is almost never graded and are almost always anonymous.

- **Context-Specific.** Classroom Assessments have to respond to the particular needs and characteristics of the teachers, students, and disciplines to which they are applied. What works well in one class will not necessarily work in another.

- **Ongoing.** Classroom Assessment is an ongoing process, best thought of as the creating and maintenance of a classroom “feedback loop”. By using a number of simple Classroom Assessment Techniques that are quick and easy to use, teachers get feedback from students on their learning. Faculty then complete the loop by providing students with feedback on the results of the assessment, and suggestions for improving learning. To check on the usefulness of their suggestions, faculty use Classroom Assessment again, continuing the “feedback loop”. As the approach becomes integrated into everyday classroom activities, the communications loop connecting faculty and students—and teaching and learning—becomes more efficient and more effective.

- **Rooted in Good Teaching Practice.** Classroom Assessment is an attempt to build on existing good practice by making feedback on students’ learning more systematic, more flexible, and more effective. Teachers already ask questions, react to students’ questions, monitor body language and facial expressions, read homework and tests, and so on. Classroom Assessment provides a way to integrate assessment systematically and seamlessly into the traditional classroom teaching and learning process.
Doing Classroom Assessment

To begin Classroom Assessment it is recommended that only one or two of the simplest Classroom Assessment Techniques are tried in only one class. In this way very little planning or preparation time and energy of the teacher and students is risked. In most cases, trying out a simple Classroom Assessment Technique will require only five to ten minutes of class time and less than an hour of time out of class. After trying one or two quick assessments, the decision as to whether this approach is worth further investments of time and energy can be made. This process of starting small involves three steps:

Step 1: Planning
Select one, and only one, of your classes in which to try out the Classroom Assessment. Decide on the class meeting and select a Classroom Assessment Technique. Choose a simple and quick one.

Step 2: Implementing
Make sure the students know what you are doing and that they clearly understand the procedure. Collect the responses and analyze them as soon as possible.

Step 3: Responding
To capitalize on time spent assessing, and to motivate students to become actively involved, “close the feedback loop” by letting them know what you learned from the assessments and what difference that information will make.

Five suggestions for a successful start:
1. If a Classroom Assessment Techniques does not appeal to your intuition and professional judgement as a teacher, don’t use it.
2. Don’t make Classroom Assessment into a self-inflicted chore or burden.
3. Don’t ask your students to use any Classroom Assessment Technique you haven’t previously tried on yourself.
4. Allow for more time than you think you will need to carry out and respond to the assessment.
5. Make sure to “close the loop.” Let students know what you learn from their feedback, and how you and they can use that information to improve learning.
Classroom Assessment Techniques: Examples

1. Background Knowledge Probe

Description. At the first class meeting, many college teachers ask students for general information on their level of preparation, often requesting that students list courses they have already taken in the relevant field. This technique is designed to collect much more specific, and more useful, feedback on students’ prior learning. Background Knowledge Probes are short, simple questionnaires prepared by instructors for use at the beginning of a course, at the start of a new unit or lesson, or prior to introducing an important new topic. A given Background Knowledge Probe may require students to write short answers, to circle the correct response to multiple-choice questions, or both.

Step-by-Step Procedure

1. Before introducing an important new concept, subject, or topic in the course syllabus, consider what the students may already know about it. Recognizing that their knowledge may be partial, fragmentary, simplistic, or even incorrect, try to find at least one point that most students are likely to know, and use that point to lead into other, less familiar points.

2. Prepare two or three open-ended questions, a handful of short-answer questions, or ten to twenty multiple-choice questions, that will probe the students’ existing knowledge of that concept, subject, or topic. These questions need to be carefully phrased, since a vocabulary that may not be familiar to the students can obscure your assessment of how well they know the facts or concepts.

3. Write your open-ended questions on the chalkboard, or hand out short questionnaires. Direct student to answer open-ended questions succinctly, in two or three sentences if possible. Make a point of announcing that these Background Knowledge Probes are not tests or quizzes, and will not be graded. Encourage students to give thoughtful answers that will help you make effective instructional decisions.

4. At the next class meeting, or as soon as possible, let students know the results, and tell them how that information will affect what you do as the teacher, and how it should affect what they do as learners.
2. Minute Paper

Description. No other technique has been used more often or by more college teachers than the Minute Paper. This technique—also known as the One-Minute Paper and the Half-Sheet Response—provides a quick, and extremely simple way to collect written feedback on student learning. To use the Minute Paper, an instructor stops the class two or three minutes early and asks students to respond briefly to some variation on the following two questions: “What was the most important thing you learned during this class?” and “What important question remains unanswered?” Students then write their responses on index cards or half-sheets of scrap paper and hand them in.

Step-by-Step Procedure

1. Decide first what you want to focus on and, as a consequence, when to administer the Minute Paper. If you want to focus on students’ understanding of a lecture, the last few minutes of class may be the best time. If your focus is on a prior homework assignment, however, the first few minutes may be more appropriate.

2. Using the two basic questions from the “Description” above as starting points, write Minute Paper prompts that fit your course and students. Try out your Minute Paper on a colleague or teaching assistant before using it in class.

3. Plan to set aside five to ten minutes of your next class to use the technique, as well as time later to discuss the results.

4. Before class, write one or, at the most, two Minute Paper questions on the chalkboard, or prepare an overhead transparency.

5. At a convenient time, hand out index cards or half-sheets of scrap paper.

6. Unless there is a very good reason to know who wrote what, direct students to leave their names off the papers or cards.

7. Let the students know how much time they will have (two to five minutes per question is usually enough), what kinds of answers you want (words, phrases, or short sentences), and when they can expect your feedback.

3. Muddiest Point

Description. The Muddiest Point is just about the simplest technique one can use. It is also remarkable efficient, since it provides a high information return for a very low investment of time and energy. The technique consists of asking students to jot down a quick response to one question: “What was the muddiest point in [blank]?”. The focus of the Muddiest Point assessment might be a lecture, a discussion, a homework assignment, a play, or a film.
Step-by-Step Procedure

1. Determine what you want feedback on: the entire class session or one self-contained segment? A lecture, a discussion, a presentation?

2. If you are using the technique in class, reserve a few minutes at the end of the class session. Leave enough time to ask the question, to allow students to respond, and to collect their responses by the usual ending time.

3. Let students know beforehand how much time they will have to respond and what use you will make of their responses.

4. Pass out slips of paper or index cards for students to write on.

5. Collect the responses as or before students leave. Stationing yourself at the door and collecting “muddy points” as students file out is one way; leaving a “muddy point” collection box by the exit is another.

6. Respond to the students’ feedback during the next class meeting or as soon as possible afterward.

4. One-Sentence Summary

Description. This simple technique challenges students to answer the questions, “Who does what to whom, when, where, how, and why?” (represented by the letters WDWWWWWHW) about a given topic, and then to synthesize those answers into a simple informative, grammatical, and long summary sentence.

Step-by-Step Procedure

1. Select an important topic or work that your students have recently studied in your course, and that you expect them to learn to summarize.


3. Next, turn your answers into a grammatical sentence that follows the WDWWWWWH pattern. Note how long this second step takes.

4. Allow your students up to twice as much time as it took you to carry out the task, and give them clear direction on the One-Sentence Summary technique before you announce the topic to be summarized.
5. What’s the Principle?

Description. After students figure out what type of problem they are dealing with, they often must then decide what principle or principles to apply in order to solve the problem. This technique focuses on this step in problem solving. It provides students with a few problems and asks them to state the principle that best applies to each problem.

Step-by-Step Procedure

1. Identify the basic principles that you expect students to learn in your course. Make sure you focus only on those that students have been taught.

2. Find or create sample problems or short examples that illustrate each of these principles. Each example should illustrate only one principle.

3. Create a “What’s the Principle?” form that includes a listing of the relevant principles and specific examples or problems for students to match to those principles.

4. Try out your assessment on a graduate student or colleague to make certain it is not too difficult or too time-consuming to use in class.

5. After you have made any necessary revisions to the form, apply the assessment.
Promoting Independence in the Classroom

Introduction

Whenever people come together there are predictable stages in their development as a group. This paper is about students coming together in college classes and how instructors can manage the predictable stages in the classes’ development to optimize learning.

Important research on group development has been done by Tuckman. He describes the four stages of group development as the Forming, Storming, Norming, and Performing stages. Parallel work by Lacoursiere will be used as the primary reference for this paper.

Appropriate responses by instructors to their classes’ developmental stages will reflect the ideas of Hersey and Blanchard’s Situational Leadership Model.

The Stages of Group Development

“What feelings and reactions do the following people have in common? Executives in a one-week seminar on understanding human behaviour, law students during a semester of legal internship, participants in a training group experience, psychiatric residents in a three-year training program, undergraduate students going through college, members of a government advisory committee, members of a psychotherapy group, and maybe people ‘in love’? Studying people in these situations reveals strikingly that they go through similar stages or phases.

“People in these situations generally start with a period of assessment or orientation, with some concerns over what it is all about but with positive expectations that something good will come of it. Almost invariably, after some period of time, the realities of the situation—the difficulties of learning and applying learning to actual external situations, the degree of acceptance of the committees advice, the difficulties of the psychotherapy, the foibles of the loved one—force themselves upon the person, and reality almost never lives up to the person’s hopes and fantasies. This ‘encounter with reality’ is usually a disappointing confrontation bringing about frustration, dissatisfaction, often anger and sometimes a sense of discouragement or depression. The person’s enthusiasm and morale fall, sometimes precipitously.

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3 Earl Bloor. Centre for Curriculum, Transfer and Technology.
“If the individual or the group is to persevere in the situation and profit from it—learn what one is trying to learn, present appropriate advice in an acceptable form, improve one’s mental distress, grow in a love relationship—there must be a resolution of the stage or phase of frustration and dissatisfaction. Then the individual will reach a more productive period or stage of production, in which he or she achieves what is considered a decent level of return—earning, work or mutuality—in which greater enthusiasm and morale are restored. This improved stage of learning and working with less frustration and dissatisfaction can then continue, often with milder fluctuations, until the end of the experience is approached.

“As this end is approached, and reached, the person has certain feelings about termination. Usually there is some sense of loss, and possibly sadness, over the end or anticipated end of a favourable experience. Often there is also a positive feeling from having achieved something worthwhile, but sometimes the positive feeling of accomplishment covers up experiencing what is being lost. For example, the elation of completing college may cover up the loss of college friends, a certain carefree life, and so on. Instead of a visible sense of loss, there may be one of denial and of otherwise covering up the sadness. The denial may go all the way to pseudoeuphoria, and this or more subtle denial may alternate with a sense of loss or sadness.” (Lacoursiere, pp. 19,20)

Lacoursiere proposes five distinct stages in a group’s lifetime—Orientation, Dissatisfaction, Resolution, Production, and Termination.

1. The Orientation Stage. Students are eager at the outset with a general expectation that something good will come of their participation in the class. At the same time there is a certain level of anxiety as the students discover what will be expected of them and how their time will be spent. Students will likely have questions about other members of the class, such as who they are, what they are like, and what they will do. The students are quite dependent upon the instructor in this stage.

Considerable time and energy are used in defining the process and getting acquainted. The amount of work done in this stage toward learning course material is accordingly low to moderate.

2. The Dissatisfaction Stage. Rarely does the reality of the course match learners’ fantasized expectations. Furthermore, the learners’ dependence on the instructor becomes frustrating. Sometimes there is a sense of incompetence inspired by lack of confidence or initial failures.

Overall this is a time of some dissatisfaction. Negative feelings usually become stronger and are more prominent than earlier feelings of eagerness and the hope of gaining from participation in the class. In fact, the negative feelings may disrupt the learning, and it may be necessary to spend some time working out the feelings of dissatisfaction.
Occasionally the dissatisfaction phase will not manifest itself as a group phenomenon. Rather, individuals will struggle independently to resolve their dissatisfaction.

The dissatisfaction stage is resolved when learners achieve a sense of growth through the acquisition of new, but not yet perfected, skills and knowledge.

3. **The Resolution Stage.** The resolution stage marks the transition from feelings of dissatisfaction to actual achievement of tasks. During this stage, some rapprochement must be established between expectations and realities, and there must be a real sense of growth in skills, knowledge, and attitudes. If this does not happen, the student may drop out of the course.

Important interpersonal issues of resolution may entail decreasing animosity among class members and between the students and the instructor. Class cohesion may first be noticed at this stage.

4. **The Production Stage.** This stage is characterized by positive feelings of eagerness to be part of the experience; and anticipation of success. Learners will work together with satisfactory agreement—often implicit—about the nature of their relationships. Also, a class that in its orientation stage was quite dependent on the instructor will now accept—and demand—more autonomy.

5. **The Termination Stage.** As the end of the course approaches, the class will begin to have some concern regarding its dissolution. There is often a sense of loss for the experience in general, for classmates, and maybe for instructors. In most cases, the positive feelings of growth and learning are stronger than the negative ones of loss. Instructors need to respect the existence of the termination phase and work with students toward achieving meaningful closure to their shared activity.

**Stages of Group Development and Group Work**

The group's work on its task (achieving the learning outcomes), in spite of some periods of low morale (or socio-emotional tone), progresses steadily throughout the group's existence (see Figure 1).
Leadership in the Classroom

A key to being an effective classroom instructor is providing timely and effective leadership. The fundamentals of effective leadership are:

1. understanding people’s past behaviour
2. predicting future behaviour
3. directing, changing, and controlling behaviour

Leadership theory identifies two extreme positions—the autocratic (or directive) leader at one extreme, and, at the other extreme, the democratic leader (the leader who helps followers share information, make decisions, and solve problems).

Hersey and Blanchard relate the autocratic extreme to task behaviour and the democratic extreme to relationship behaviour. Task behaviour is the extent to which leaders engage in spelling out the duties and responsibilities of the individuals or the group. Behaviours include telling people what to do, how to do it, when to do it, and who’s to do it. Relationship behaviour is the extent to which the leader engages in two-way or multi-way communication. Behaviours include listening, encouraging, facilitating, providing clarification, and giving socio-emotional support.
Hersey and Blanchard argue that to be effective, a leader must employ varying amounts of task and relationship behaviour depending on the situation. Their model for Situational Leadership is illustrated in Figure 2.

![Situational Leadership Theory Diagram](image)

**Figure 2: Situational Leadership Theory**

The most appropriate situational leadership style depends on the readiness of the follower. An instructor needs to be directing during the first few days of classes, explaining the rules and procedures for the class. As the term progresses, the goal of the instructor will be to move the students into situations where they are able to learn independently of instructor intervention. But to get to the delegating leadership style, the instructor and individuals in the class must move progressively through the coaching (high task and high relationship) and the supporting (low task and high relationship) leadership styles. The correlation of leadership styles to stages of group development is given below.

<table>
<thead>
<tr>
<th>Group Developmental Stage</th>
<th>Orientation</th>
<th>Dissatisfaction</th>
<th>Resolution</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directing</td>
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<td>Coaching</td>
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<td>Supporting</td>
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<tr>
<td>Delegating</td>
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</tbody>
</table>

**Situational Leadership Style**
ACADEMIC SKILLS
Those skills that provide the basic foundation to get, keep and progress on a job and to achieve the best results. Canadian employers need a person who can:

COMMUNICATE
- Understand and speak the languages in which business is conducted
- Listen to understand and learn
- Read, comprehend and use written materials, including graphs, charts and displays
- Write effectively in the languages in which business is conducted

THINK
- Think critically and act logically to evaluate situations, solve problems and make decisions
- Understand and solve problems involving mathematics and use the results
- Use technology, instruments, tools and information systems effectively
- Access and apply specialized knowledge from various fields (e.g., skilled trades, technology, physical sciences, arts and social sciences)

LEARN
- Continue to learn for life

PERSONAL MANAGEMENT SKILLS
The combination of skills, attitudes and behaviours required to get, keep and progress on a job and to achieve the best results. Canadian employers need a person who can demonstrate:

POSITIVE ATTITUDES & BEHAVIOURS
- Honesty, integrity and personal ethics
- A positive attitude toward learning, growth and personal health Initiative, energy and persistence to get the job done

RESPONSIBILITY
- The ability to set goals and priorities in work and personal life
- The ability to plan and manage time, money and other resources to achieve goals
- Accountability for actions taken

ADAPTABILITY
- A positive attitude toward change
- Recognition of and respect for people’s diversity and individual differences
- The ability to identify and suggest new ideas to get the job done—creativity

TEAMWORK SKILLS
Those skills needed to work with others on a job and to achieve the best results. Canadian employers need a person who can:

WORK WITH OTHERS
- Understand and contribute to the organization’s goals
- Understand and work within the culture of the group
- Plan and make decisions with others and support the outcomes Respect the thoughts and opinions of others in the group
- Exercise “give and take” to achieve group results
- Seek a team approach as appropriate Lead when appropriate, mobilizing the group for high performance

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*“Employability Skills Profile” was developed by the Corporate Council of Education, a program of the National Business and Education Centre, and The Conference Board of Canada.*
We Never Said It Would Be Easy

Doing anything new and non-trivial always involves a learning curve. The curve may be particularly steep for both you and your students when you try active learning approaches for the first time. Adults who think that teachers should tell them everything they need to know don’t appreciate having this support suddenly withdrawn, and complaints like “Our instructor never teaches us anything—we have to do it all ourselves” start echoing through the corridors. It’s even worse if you use cooperative (team-based) learning: students gripe loudly and bitterly about other team members not pulling their weight, or about being slowed down by having to explain everything to that lemon they’ve been forced to team with.

Instructors need to be assured that these initial glitches are both common and natural, and that they may be a cause for concern but not for panic or discouragement. The trick is knowing how the process works, taking a few precautionary steps to smooth out the bumps, and waiting out the inevitable setbacks until the payoffs start emerging.

Consider the students. Woods[1] observes that students forced to take major responsibility for their own learning go through some or all of the steps psychologists associate with trauma and grief:

1. SHOCK: “I don’t believe it—we have to do homework in groups and she isn’t going to lecture on the chapter before the problems are due?”
2. DENIAL: “She can’t be serious about this—if I ignore it, it will go away.”
3. STRONG EMOTION: “I can’t do it—I’d better drop the course and take it next semester” or “She can’t do this to me—I’m going to complain to the department head!”
4. RESISTANCE AND WITHDRAWAL: “I’m not going to play her dumb games—I don’t care if she fails me.”
5. SURRENDER AND ACCEPTANCE: “OK, I think it’s stupid but I’m stuck with it and I might as well give it a shot.”
6. STRUGGLE AND EXPLORATION: “These other guys seem to be getting this stuff—maybe I need to try harder or do things differently to get it to work for me.”
7. RETURN OF CONFIDENCE: “Hey, this is starting to work. I think I can do it.”
8. INTEGRATION AND SUCCESS: “YES! This stuff really works—I don’t understand why I had so much trouble with it before.”

7 Adapted from an article in Chemical Engineering Education, 29 (1), 32-33 (1995) by Richard M. Felder
Just as some people have an easier time than others in getting through the grieving process, some students may enthusiastically dive right into active learning and short-circuit many of the eight steps, while others may have difficulty getting past the negativity of Step 3. The point is to remember that the resistance you encounter from some students is a natural part of their journey from dependence to intellectual autonomy, and if you provide some help along the way, sooner or later most of them will make it.

So what can you do to help them and yourself get through the process?

» SET THE STAGE. When you plan to use active or cooperative learning in a course, explain on Day 1 exactly what you are going to do and why. Assure the class, for example, that you will be making them work in class not to make your life easier (quite the contrary), but because research shows that students learn by doing, not by just watching and listening. You can reinforce this point by citing some of the research; as always, McKeachie [2] and Wankat and Oreovicz [3] provide good general summaries and Johnson, et al. [4] cite results specifically for cooperative learning.

» PROVIDE COACHING ON THE SKILLS YOU WANT THE LEARNERS TO DEVELOP. When learners complain (or make evident in other ways) that they don’t know how to set up problem solutions or prepare for tests or work effectively in teams, offer guidance or occasionally hold a miniclinic in class. Woods, Wankat and Oreovicz, and Johnson, et al., are rich sources of methods for facilitating development of learning and teamwork skills.

» GET FEEDBACK AND TRY TO BE RESPONSIVE TO IT. Especially when many learners in a class seem to be spending a great deal of their time hovering around Stages 3 and 4 of the trauma scale (loss of confidence, anger, and withdrawal), grit your teeth and conduct a midsemester evaluation, asking them to list things they like about the class, things they dislike, and things that would improve the class for them. The first list may surprise you: what you've been doing has actually been working for most of the learners, complaints from the minority have monopolized your attention. The things they dislike are not exactly fun to read, but learn from them and the students seem to appreciate the opportunity to vent. The suggested improvements may include some that are unacceptable to you (“Stop assigning problems that you haven’t lectured on.” “Cut out this group garbage.”) but you may be able to act on others without seriously disrupting your plans or compromising your principles. When you respond positively to some of their suggestions (like easing off on the length of the homework assignments, or giving them the option of doing a few assignments individually), it will go a long way toward getting them to meet you halfway.
BE PATIENT. Expect many of your students (especially those you haven’t previously taught) to be frustrated and upset in the first few weeks of your courses. You will learn from experience that most of them will turn around by the final exam.

GO BACK TO THE REFERENCES PERIODICALLY. If your cooperative learning groups seem to be disintegrating halfway through the semester, review the monographs. You will usually be reminded of recommended cooperative learning practices you have been neglecting, such as having the groups regularly assess their functioning to work out what they need to do differently in the future.

DON'T EXPECT TO WIN THEM ALL. In the end, despite all your best efforts, some students fail and some who pass continue to resent so much of the burden of their learning being placed on their shoulders. For all their complaints, students on the average earn higher grades than they ever do in lectured-based classes. Many will tell you that after getting through one of your courses they feel confident that they can do anything.

References

1. Donald R. Woods. Problem-Based Learning: How to Gain the Most from PBL., McMaster University, 1994.


Using This Integrated Resource Package

This Integrated Resource Package (IRP) is designed to provide Adult Basic Education (ABE) Computer Studies instructors with suggested strategies and resources to teach the articulated learning outcomes with an applied focus. As the name implies, this is a package of resources for you to choose from—there is far more material in this IRP than could be covered in any ordinary advanced-level course.

Provincially Articulated Learning Outcomes were determined in consultation with receiving departments and articulated according to the established procedures for ABE articulation. They represent a contract between the learner and the preparing and receiving departments. That is, based on information received from departments that receive learners from ABE programs, learners can enter subsequent post-secondary education programs secure in the knowledge that achievement of a prescribed set of skills, knowledge, and attitudes while in their ABE program (and continued due diligence) will support their eventual successful completion of that program.

The learning outcome statements set out the skills, knowledge, and attitudes for the course. The learning outcomes are statements of what learners are expected to know and be able to do. Learning outcomes are clearly stated, expressed in measurable terms, and complete the stem, “It is expected that learners will be able to ...” Outcome statements are written to allow instructors to use their experience and professional judgment in planning and evaluating. The outcomes are standards that will be useful to instructors in establishing benchmarks for criterion-referenced assessment of student performance.

Suggested Instructional Strategies involve the selection of “applied” techniques, activities, and methods that can be used to meet diverse student needs and deliver the prescribed curriculum. Instructors are free to adapt and use the suggested instructional strategies or substitute others that they feel will enable their students to achieve the prescribed outcomes. These strategies were developed by specialist and generalist instructors to assist their colleagues; they are suggestions only.
Suggested Assessment Strategies consist of a variety of ideas and methods to gather evidence of students' achievement of the learning outcomes. Some assessment strategies relate to specific activities; others are general and apply to any activity. They are both formative and summative: that is, they will help assess whether students are “getting it” during the instruction, and whether they have “gotten it” finally. These strategies were also developed by specialist and generalist instructors from both the ABE and receiving departments to assist their colleagues; they are suggestions only.

Suggested Learning Resources identified in the fourth column are resources that instructors can easily acquire to support their classroom instruction.

A comprehensive list of instructional resources for INFORMATION TECHNOLOGY 11 AND 12 is available in the MEST IRP. The list is available on the Internet at http://www.est.gov.bc.ca/curriculum/irps/it1112/ittoc.htm
Applied Computer Studies: Advanced Level

The goal of this introductory computer course is to help learners develop basic skills and knowledge in personal computer technology and microcomputer applications. The course provides extensive hands-on computer practice, including practical skill development using an integrated software suite (package) such as Microsoft Works or Microsoft Office. Learners will be prepared to pursue further studies in computer applications or to enter the job market with basic computer employability skills.

Learners will be equipped to act as informed users and consumers of computer technology. In addition, they will be able to employ a computer as a presentation and problem-solving tool.

Specifically, learners will be able to:

• describe the basic components and operation of personal computer systems, including processors, memory, secondary storage, and a variety of input and output devices

• perform basic operations of disk and file management, word processing, spreadsheet, and database applications

• describe and apply terms and concepts of data representation, data communications, and operating systems
1. **Hardware**

In personal and work life, computing involves hardware. To use computers effectively, learners need to identify computer system components and describe their functions. Continually evolving technology provides an expanding range of hardware components.

### 1 A. **Computer System Overview**

#### Learning Outcomes

*It is expected that learners will be able to:*

a. identify, name and describe basic components of a computer system:
   
i. system unit
   
ii. memory and secondary storage devices
   
iii. input and output devices

#### Suggested Instructional Strategies

This is strictly an overview learning activity:

- Provide an overview of a computer system.
- Display transparencies of key system components.
- Draw an analogy between computers and people receiving, processing, and outputting information.
- Have learner groups bring in current newspaper ads of computer systems for sale to compare and evaluate types of CPU, bus, RAM, hard drive, and other peripherals.

(This activity might also be considered as a summative assessment after in-depth learning has taken place in the unit on hardware.)
Suggested Assessment Strategies

No assessment strategies are provided for the overview outcome.

Suggested Learning Resources

A complete computer system consisting of:

- system unit
- input peripherals (keyboard, mouse, scanner, etc.)
- output peripherals (monitor, printer, etc.)
- secondary storage devices (floppy disk drives and disks, hard disks, CD-ROMs)
1 B. System Unit Components

**Learning Outcomes**

*It is expected that learners will be able to:*

a. identify, name, and describe key components of a computer system unit:
   i. motherboard
   ii. expansion slots and bus type
   iii. Central Processing Unit (CPU chip)
   iv. Memory (RAM chips)
   v. peripheral connections/ports (parallel, serial, SCSI, etc.)

**Suggested Instructional Strategies**

- Visit a facility where computers are manufactured or repaired.
- Use a computer-based tutorial software package (self-paced) to introduce learners to system components. Have learners complete selected lessons.
- Open a computer system unit (CPU box), and identify and describe system components to learners.
- Give a Mini-Lecture describing components.
- Learners read/study text/multimedia presentations of computer system components and operations.
Suggested Assessment Strategies

- Instructor or learners co-operatively point to system components while learners being assessed write correct identification of component. Alternately, have an old computer with key components marked with a number, and have learners write the name of the numbered components.
- Use assessment components existing in tutorial software.
- Have learners complete a multiple choice test to describe system components.
- Administer a quiz to identify system components using clipart/diagrams/schematics.
- Summative evaluation project described in Assessment Strategies of Unit 3.

Suggested Learning Resources

- Computer-based learning package: Professor DOS (a DOS program) (Individual Software Co.)
- Tutorial in MS-Works: Topic—Fundamental; Lesson—Introducing Computers
- Several excellent texts for use throughout sections A, B, C, and I are listed in Appendix B of this IRP.
- A computer that can easily be opened for demonstration.
- How Computers Work. Ziff-Davis Press. (also available with CD-ROM illustrations/tutorial (manual texts are produced with supplementary learning resources, including web sites and/or CD-ROMs)
1 C. Memory and Secondary Storage

Learning Outcomes

It is expected that learners will be able to:

a. identify, name, and describe Secondary Storage Devices, including:
   i. floppy disks
   ii. hard disks
   iii. CD-ROM
   iv. optical and magneto-optical storage devices
   v. tape drives

b. recognize and use memory descriptors (KB, MB, GB)

c. describe proper floppy disk handling procedures and care

d. describe the structure and organization of Primary Memory-Random Access Memory (RAM): Conventional Memory, Upper Memory, Extended Memory, Expanded Memory

e. recognize the DOS limit of 640kb of Conventional Memory

f. distinguish between RAM and ROM chips (refer to BIOS, CMOS)

Suggested Instructional Strategies

- Present learners with a coded binary message to decode using collaborative learning strategies.
- Present the words: "bits," "bytes," and "Mega-bytes" using fonts that increase in size.
- Have learners estimate the storage requirements for an encyclopedia set.
- Provide a variety of software packages and have learners determine the amount of space required to load various options.
- Learners complete selected lessons in Professor DOS (Individual Software Co.).
- Work through tutorial in MS-Works.

Topic: Fundamental
Lesson: Introducing Computers

- Give a Mini-Lecture:
  - Take apart floppy disks (3.5 and 5.25) and a hard drive, and let learners handle and examine the disks.
  - Describe storage medium and storage processes/principles (magnetic changes); contrast with magnetic audio tapes and music CD-ROMs.
  - Describe a real-life situation of work lost if it is NOT saved to secondary storage device.
  - Describe processes and principles of storing BITS and BYTES.

- Show a visual representation (graphics presentation) of bits and bytes being magnetized on a secondary storage device.

- Discuss and demonstrate handling and care of floppy disks, CD-ROMs, etc.

- Give a Mini-Lecture describing the structure and organization of Primary Memory. Have actual hardware (SIMMs, DRAMs, BIOS ROMs) for learners to examine if possible.

- Create Mini-Lessons in graphics presentation software showing memory structure and providing characteristics in bullet/reveal fashion.
Suggested Assessment Strategies

- Give a written test (multiple choice or true/false).
- Have pairs of learners describe to each other the process of data storage.
- Have learners demonstrate the ability to encode and decode binary messages.
- Present a schematic diagram of memory structure and numbered items to be identified and described by learners.
- Present a variety of storage sizes (e.g., 2 Million bits, 1 Million Bytes, 0.5 GB) and have learners arrange in ascending size.

Suggested Learning Resources

- Floppy disks and a hard drive to be taken apart.
- Professor DOS (Individual Software Co.)
- How Computers Work. Ziff-Davis Press. (also available with CD-ROM illustrations and tutorial)
- Computer-based multimedia learning materials that accompany texts.
- Various textbook illustrations and transparencies showing disk tracks, sectors, and blocks.
- Software to illustrate memory usage (MS-DOS MEM, Norton Utilities, PCTools, QEMM)
1 D. Input and Output

Learning Outcomes

It is expected that learners will be able to:

a. identify, name, describe, and distinguish between input and output devices:
   i. keyboard, pointing devices
   ii. scanners, digital cameras, video capture devices
   iii. monitors (CRT, LCD, projectors)
   iv. printers (various types)
   v. voice

b. explain the ways that computers communicate with each other:
   i. modem
   ii. networks

Suggested Instructional Strategies

The theory of this section could be combined with the practical applications in “9. Communications.”

- Learners use computer-based tutorials to develop skills in keyboarding and mouse operations.
- Discuss and demonstrate the characteristics of a variety of input and output devices.
  - Example: Video Output—demonstrate or have learners demonstrate different video output settings to change screen resolutions and colour output. Evaluate resolution settings in relation to screen size.
- Demonstrate digitizing input devices (scanners, digital cameras, etc.)
- Create an opportunity for co-operative learning by initiating a special project: “The Right Printer?”
  - Have learners obtain printer specifications and characteristics (from manufacturer’s documentation, specification sheets, and sample printout sheets from a variety of printers) and then present findings.
- Discuss and demonstrate how someone with a physical disability (e.g., a quadriplegic) who cannot use a standard computer keyboard can use a computer through an alternate input device.
- Have learners discuss the following question and summarize conclusions: “What physical factors of machine/human interaction would limit the size of portable computer construction?”
- Demonstrate or have learners demonstrate a variety of modems and their capabilities, connecting the modem to a variety of services (e.g., Internet, a library).
- Connect two computers using a null-modem cable, and use communications software with a host/remote mode. Have learners participate in a real-time chat on these two computers.
Suggested Assessment Strategies

- Give a written test (multiple choice or true/false).
- Establish with learners criteria for project assessment.
- Look for evidence that learners are able to identify/label diagrams/schematics when working with a variety of input/output devices.

Suggested Learning Resources

- a variety of input and output devices for demonstrations
- print samples and specification sheets from retailers
- a variety of modems and other equipment for demonstration
- CBT—CD-ROM multimedia learning support materials
- BC Tel Learning Resources Centre Video Catalogue
- a network of computers
2. Operating a Microcomputer

To effectively use a computer system, users must understand the basic principles of operating systems and how to use them to organize files efficiently. By developing skills in the operation of computer systems, learners will improve their productivity and increase their value in the workplace.

<table>
<thead>
<tr>
<th>Learning Outcomes</th>
<th>Suggested Instructional Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. distinguish between System Software, Utility Software and Application Software and describe the purpose of an operating system</td>
<td>• Start a computer with a Non-System disk and observe the error message. Learners are asked to observe, comment, and address the question: What does every computer need to operate?</td>
</tr>
<tr>
<td>b. differentiate among various operating systems, including DOS, Windows 95, Macintosh, and OS2</td>
<td>• Give a Mini-Lecture on system software vs application software.</td>
</tr>
<tr>
<td>c. employ operating system(s) to perform basic operations of disk and file management:</td>
<td>• Explain the purpose and function of an operating system.</td>
</tr>
<tr>
<td>i. state the rules and conventions of DOS file naming</td>
<td>• Provide summary sheets and spec/advertising sheets for different operating systems.</td>
</tr>
<tr>
<td>ii. employ wildcards ? and * in filenaming applications</td>
<td>• Have learners work together to develop a table for comparing and contrasting characteristics of different operating systems.</td>
</tr>
<tr>
<td>iii. identify legal and illegal DOS filenames (also refer to Windows '95 filename conventions)</td>
<td>• Provide a set of filenames (legal and illegal) for learners to identify correct filenames. (also refer to Windows '95 filename conventions)</td>
</tr>
<tr>
<td>iv. distinguish between DOS Internal (basic commands in the DOS kernel) and External commands (commands that need to be accessed by a specific path)</td>
<td>• Provide hands-on exercises in file management that provide learners with opportunities to apply the outcomes.</td>
</tr>
<tr>
<td>v. describe, and employ basic commands to perform, file management functions:</td>
<td>• Provide discovery exercises to demonstrate variations of file listing parameters.</td>
</tr>
<tr>
<td>file listings with parameter variations; disk format (with system and without system); copy, rename, delete, undelete files; show content of .TXT (ASCII) files; make, change, and rename directories; distinguish between files and directories</td>
<td>• Encourage learners to discover that unless a path is provided to an external command, it is NOT available for execution.</td>
</tr>
<tr>
<td>vi. recognize a variety of file types and file extensions, including .EXE, .COM, .BAT, .SYS, .DRV, and .PRN</td>
<td>• Ask learners to match file extensions and statements of extension meanings.</td>
</tr>
<tr>
<td>vii. describe the problem of computer viruses and steps to detect and clean files infected with viruses</td>
<td>• Have learners try to execute a number of different files so that they discover only .COM, .EXE, and .BAT files execute.</td>
</tr>
<tr>
<td>viii. create a bootable emergency disk</td>
<td>• Have learners use the TYPE command or the MS-DOS Editor to display a number of types of files so that they discover only certain files can be displayed effectively.</td>
</tr>
<tr>
<td>d. demonstrate care, maintenance, and protection of computer equipment</td>
<td>• Give a Mini-Lecture on typical virus characteristics and behaviour in infecting certain file types.</td>
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</table>

continued on next page
Learning Outcomes

Learning outcomes for Operating a Microcomputer are listed on the previous page.

Suggested Instructional Strategies

• Discuss problems arising from virus infections in business or organizational settings. This could be done using a collaborative, co-operative learning approach.

• Using anti-virus software, have learners detect and clean an infected floppy disk.

• Discuss care, maintenance, and protection of equipment linked to and integrated with specific items of equipment. (These outcomes should be developed throughout the course and revisited as needed.)

• Ask learners to develop and place in prominent places posters that highlight procedures.

• Have learners create and test an emergency disk that it is bootable.

• Discuss the importance of, and procedures for, backing up data files.

• Create a crossword puzzle using DOS commands.

• Provide learners with a list of correct and incorrect DOS commands, and have them identify and correct any incorrect commands.

• Create a lab activity where learners create directories, remove directories, and organize files within the directories.
**Suggested Assessment Strategies**

- Provide written questions for a multiple choice or true/false test on differentiating the characteristics of operating systems.
- Provide a set of operating system specific characteristics and ask learners to assign these to the correct operating system.
- Provide written testing of file naming.
- Provide practical tasks to demonstrate competency in file management tasks.
- Observe learner behaviour when using computer equipment.

**Suggested Learning Resources**

- Cross-word Creator shareware software program
- computer-based DOS tutorials
- text references and other published or distributed materials
- instructor-prepared file management exercises or practical tasks from other sources
- information on file types and their characteristics (e.g., *PC Novice* and *PC Today*)
- Appendix B references
3. Computers in Society

Life is now unthinkable without computers. They are everywhere and touch everyone’s life, raising such issues as security, privacy, and ownership of information. Microcomputers are common tools in workplaces and homes.

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<thead>
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<td>b. give examples of career opportunities related to computers</td>
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<td>c. identify the current trends in computer technology</td>
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<tr>
<td>d. identify a range of purchasing considerations of an informed consumer, including but not limited to: warranty, service, licensing, needs assessment, market trends</td>
</tr>
<tr>
<td>e. identify and discuss ethical issues involving computers in society</td>
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</table>

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<th>Suggested Instructional Strategies</th>
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<tbody>
<tr>
<td>• Use co-operative, collaborative learning approaches to explore advantages and disadvantages of various uses of computers in society.</td>
</tr>
<tr>
<td>• Use various media, including the Internet, to research the impact of computers on employment trends and opportunities for employment in the computer field. Post items on a bulletin board display/column.</td>
</tr>
<tr>
<td>• Have learners report on recent articles, notes collected from current computer magazines, and Internet sources on recent trends in technology.</td>
</tr>
<tr>
<td>• Discuss computer advertisements from local newspapers. Have learners compare costs and features of different systems.</td>
</tr>
<tr>
<td>• Present information to learners on rapid changes in technology (e.g., compare average hard drive capacities over the past ten years).</td>
</tr>
<tr>
<td>• Have a guest speaker address the use of computers in her or his organization and how computers have changed the way the organization does business.</td>
</tr>
<tr>
<td>• Initiate discussion on issues such as: access to computers, personal frustrations with computers, computer literacy, future trends in computing and the impact of computers on people’s lives.</td>
</tr>
<tr>
<td>• Have learners identify contacts they have had with computer technology in the last 24 hours.</td>
</tr>
<tr>
<td>• Have learners form groups and conduct debates on the use of computers in society.</td>
</tr>
<tr>
<td>• Have learners watch the movie, The Net, to discover and discuss ethical issues (breach of security, misuse of databases, computer crime, viruses, etc.).</td>
</tr>
</tbody>
</table>
Suggested Assessment Strategies

- Project/presentation (co-operative learning): *Computers in Society*
  - Ask learners to collect news items, clippings, articles, etc. dealing with issues of computers in society. Have them group the collected items in topical areas (e.g., computer misuse, computers influencing/changing the nature of work, ethical issues in computer use) to be analysed, summarized, and reported on.

- Project/presentation (co-operative learning): *Buying a Computer System*
  - Have learners specify system needs (computer uses to be provided for) and then proceed to summarize (possibly in table format) information gathered. Comparative shopping should provide the data required to make comparisons. Alternatively, the exercise could be designed as a computer system purchase for a business installation to meet specific requirements.

- Project (co-operative learning): *Virtual Computer System Assembly ('The Paper Tiger 2000')*
  - Have learners prepare a poster (large chart) displaying the components of a DOS/Windows microcomputer system with a range of input/output peripherals, using picture clippings of system components clipped from magazines. Arrange, label, describe specifications, and explain the functions of components. Short descriptive statements can be used to demonstrate knowledge of a computer system, its components, performance specifications, and reasons for selecting specific components. (Note: This project is also well suited to evaluating outcomes of the Hardware section of the course.)

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Integrated Resource Package

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>• text references</td>
</tr>
<tr>
<td>• advertising materials, local computer papers, etc.</td>
</tr>
<tr>
<td>• magazines, Internet sources</td>
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</tbody>
</table>
4. Word Processing

The most widely used computer applications software is word processing. Word processing is used to create, edit, save, and print documents. These activities, once seen as the exclusive work of secretaries, are now being carried out by people in many occupations as well as by individuals for personal use.

**Learning Outcomes**

It is expected that learners will be able to:

a. perform basic operations of word processing:
   i. create a word processing document and save it to a specified disk and directory
   ii. select any amount of text and format the character attributes
   iii. format the indentation, alignment, and spacing of paragraphs
   iv. identify non-printing characters (space, tab, new line, new paragraph) as displayed on the screen
   v. move, copy, and delete text
   vi. insert a page break into a document
   vii. use footnotes/endnotes
   viii. use the *find* and *replace* functions
   ix. use the spellchecker/thesaurus
   x. insert a graphic into a document
   xi. set page margins
   xii. use headers and footers (including page numbering, filename, and date codes)
   xiii. preview and print a document
   xiv. recognize different document output devices (printers and faxes)
   xv. recognize that different file formats originating from different word processors may be incompatible, requiring file conversion routines

**Suggested Instructional Strategies**

- Provide opportunities for learners to develop word processing skills by creating business letters, resumes, and memos. Encourage learners to develop their word processing skills through examples drawn from the workplace and activities such as essays and report writing.
- Have learners complete instructor-designed or workbook-type exercises prepared specifically to develop competency for the outcomes specified.
- Demonstrate procedures that may be especially significant as essential skills. Use such devices as Liquid Crystal Displays (LCDs), large monitors, etc. for ease of viewing by the class, combined with discussion of procedural steps.
- Use sketches and diagrams on learner handouts to focus on specific skill items (e.g., illustration of tabs and tab settings; paragraph format characteristics; header/footer paragraph creation).
- Draw special attention to non-printing characters (formatting codes) that are embedded in word processing documents. Emphasize the practice of accessing view (reveal codes) functions in a given program to assist in correcting formatting problems.
- Encourage learners to apply all skills they have developed to personal, study, or work applications.
- Draw attention to problem areas: word wrap, hard and soft page breaks, tabs, spellcheck, search and replace, indenting.
- Have learners prepare reports comparing a word processor with a typewriter.
4. Word Processing

**Suggested Assessment Strategies**

- Have learners demonstrate competency to perform the outcomes by completing practical and/or written test(s) that contain specific skill items.

**Suggested Learning Resources**

- Appendix B resources list
5. **Spreadsheets**

Much of work and personal life involves manipulating data, especially financial data. A spreadsheet software application is a powerful tool to organize, manage, and manipulate such data. The ability to create 'what if scenarios' makes spreadsheets especially useful for financial planning.

**Learning Outcomes**

*It is expected that learners will be able to:*

a. perform basic spreadsheet operations:
   i. enter and format data (numbers, text, data series)
   ii. create simple formulas (simple mathematical functions)
   iii. copy, fill, repeatable data and/or formulas
   iv. change cell characteristics (column widths, alignments, fonts, etc.)
   v. enter system date function, format headers/footers
   vi. preview and print in different orientations

b. design a spreadsheet to predict outcomes based on specific parameters such as mortgages, investments, financial forecasting and planning

c. create several kinds of charts based on spreadsheet data

**Suggested Instructional Strategies**

- Provide opportunities for learners to develop skills in the use of spreadsheets in activities similar to those they will encounter in the workplace (e.g., income and expense statements, financial projections, loan amortizations with different payment options, investments).

- Have learners complete instructor-designed or workbook-type exercises prepared specifically to develop competency for the outcomes.

- Have learners create spreadsheets for use in their personal, study, or work environments: budget sheet, income and expense statement, experimental data analysis, revenue projections with different assumptions, etc.

- Demonstrate procedures that may be especially significant as essential skills. Use such devices as Liquid Crystal Displays (LCDs), large monitors, etc. for ease of viewing by the class, combined with discussion of procedural steps.

- Use sketches, diagrams, etc. to present mini-lessons on specific skill items.

- Ask learners to create a variety of chart types (e.g., bar, pie, line, combination) using data relevant to learner interest and work environments.

- Have learners track their marks in the course using a spreadsheet.

- Invite guests to discuss the use of spreadsheets in their organizations.
5. **Spreadsheets**

**Suggested Assessment Strategies**

- Have learners demonstrate competency to perform the outcomes by completing practical and/or written test(s) that contain specific skill items.

**Suggested Learning Resources**

6. Databases

In everyday life, everyone is part of one or more databases. Historically, individual records (e.g., medical, learner, business) were kept manually in file systems in file cabinets. This record keeping function is now performed by electronic databases that can manipulate data very quickly—retrieving, sorting, displaying and printing reports.

### Learning Outcomes

*It is expected that learners will be able to:*

a. describe the structure of a database: records, fields, and key fields
b. perform simple database procedures:
   i. design a form
   ii. enter, edit, and format data
   iii. examine, manipulate records in different views; delete and insert records; sort records in different ways
   iv. format, insert, move, hide and un-hide fields
   v. design, create, and print a report consisting of selected fields
c. search and query a database for information based on specified parameters

### Suggested Instructional Strategies

- Provide opportunities for learners to develop skills in the use of databases in activities similar to those they will encounter in the workplace (e.g., employee records, customer lists, inventory records).
- Have learners complete instructor-designed or workbook-type exercises prepared specifically to develop competency for the outcomes.
- Have learners create databases that they may encounter in personal, study, or work environments: address lists, learner grades, etc.
- Demonstrate procedures that may be especially significant as essential skills. Use such devices as Liquid Crystal Displays (LCDs), large monitors, etc. for ease of viewing by the class, combined with discussion of procedural steps.
- Use sketches, diagrams, etc. to present mini-lessons on specific skill items.
- Have the class discuss the importance and selection of appropriate key fields in databases.
- Encourage learners to assist outside groups and organizations in the development of databases, mailing lists, etc.
- Have learners apply database techniques to organize sports scores, wine lists, and/or CD collections.
- Have visiting guests discuss the use of databases in their organizations.
Suggested Assessment Strategies

- Have learners demonstrate competency to perform the outcomes by completing practical and/or written test(s) that contain specific skill items.

Suggested Learning Resources

- Appendix B resources list
7. Graphics Applications

Recent software developments have made it easier and cheaper to prepare graphics for presenting information visually. Information can be more effectively presented with the use of graphics, and graphics often aid in learning and understanding.

**Learning Outcomes**

It is expected that learners will be able to:

a. create and manipulate a graphic image
b. differentiate between various bit-mapped and vector-based graphic file formats such as .BMP and .TIF
c. compare graphics and character-based applications in terms of use of icons, menus, and WYSIWYG (What You See Is What You Get—vs. text)

**Suggested Instructional Strategies**

- Use a graphics software package to have learners combine their initials (from their first and last names) with a graphic image to create a personalized logo.
- Have learners use publishing/layout software (Print Shop, Print House, MS-Publisher) to design a greeting card (e.g., birthday, holiday), or banner.
- Have learners use the Windows Paint program to create a customized wallpaper. (Note: depending on how Windows is installed, it may or may not be feasible—or desirable—for learners to change the wallpaper.)
- Give learners access to a clip-art library and let them select and incorporate images into a word processing file.
- Demonstrate to learners (using a computer and a projection system) the difference between bit-mapped and vector graphics.
- Give learners a document in a file format that can be read by both a character-based word processor and a WYSIWYG word processor. Have learners load the document into both word processors, print it, and then comment on how each word processor displays formatting (bold, underline, italic) on the screen in comparison to what is printed, and also on the presence or absence icons.
- Have learners visit sites or organizations that utilize graphics.
- Invite a guest to discuss how she or her makes a living in computer graphics.
- Provide learners examples of existing company logos, and have them duplicate a logo of their choice.
- Have learners use multimedia graphics to make a presentation.
Suggested Assessment Strategies

- Conduct practical tests wherein learners can demonstrate their ability to perform the learning outcomes.

Suggested Learning Resources

- Clip-art collections, available commercially or through the Internet
- Appendix B resources list
8. Integration of Applications

As computer applications have evolved, it has become easier to include information from one application in another. Today, integrated software packages and “suites” offer a collection of programs that are designed to work together, and facilitate the sharing or combining of data.

Learning Outcomes

It is expected that learners will be able to:

a. combine data/files from various applications such as mail merge, importing spreadsheet data and charts into a document, inserting a graphic image

Suggested Instructional Strategies

• Have learners use files they have created previously (e.g., from the Word Processing, Spreadsheet, Database, and Graphics organizers) to
  - perform a mail merge (using a word processor and a database, or a word processor and a spreadsheet) using a query criteria in the mail merge, so only a portion of the records are selected and merged
  - combine a spreadsheet (or section thereof) and a spreadsheet chart into a word processing document
  - insert a graphic image into a word processing document, and re-size and re-locate the image as appropriate for the document
• Have learners develop a comprehensive presentation based on a fictitious company involving word processing, spreadsheet, database, and graphics application skills.
8. Integration of Applications

**Suggested Assessment Strategies**

- Provide practical tests where learners can demonstrate their ability to perform the learning outcomes.

**Suggested Learning Resources**

- an integrated software package (e.g., MS-Works, MS-Office, Perfect Office, Smartsuite by Lotus)
- Appendix B resources list
9. Communications

Using communications software, computer users are able to connect with other computers to share information and resources. There is currently rapid growth in the use of communications programs by business and individuals.

<table>
<thead>
<tr>
<th>Learning Outcomes</th>
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</thead>
<tbody>
<tr>
<td>It is expected that learners will be able to:</td>
</tr>
<tr>
<td>a. electronically access information from a remote source</td>
</tr>
<tr>
<td>b. electronically transfer messages and files</td>
</tr>
</tbody>
</table>

**Suggested Instructional Strategies**

- Arrange Internet accounts for learners. Have the learners send e-mail to each other, performing the following tasks:  
  - attach work completed in previous sections (e.g., word processing, spreadsheet, database) to their e-mail  
  - send course materials updates to the learners via e-mail  
  - contact an instructor in another part of the country and have e-mail exchanged between learners from each class  
  - using an instructor-supplied diverse list of world-wide web (www) sites, learners visit these sites and search for specific information or for answers to questions. Have learners search the www for information on a specific topic, or topics of interest to them.

- Have learners use communications software to contact a local BBS (e.g., a local library, their banks) and retrieve information.

- Have learners calculate the transmission time for downloading/uploading files.

- Have learners undertake a field test to confirm their estimates, and comment on any discrepancies.
9. Communications

**Suggested Assessment Strategies**

- Instructors can assess learners' achievement of learning outcomes by assessing the results of activities undertaken as part of the Suggested Instructional Strategies (e.g., e-mail arriving for the instructor, specific information or answers retrieved from a www site).

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**Suggested Learning Resources**

- "Every Student's Guide to the Internet"
- Appendix B resources list
Appendix A: Learning Outcomes

1. Hardware

1 A. Computer System Overview

a. identify, name and describe basic components of a computer system:
   i. system unit
   ii. memory and secondary storage devices
   iii. input and output devices

1 B. System Unit Components

a. identify, name, and describe key components of a computer system unit:
   i. motherboard
   ii. expansion slots and bus type
   iii. Central Processing Unit (CPU chip)
   iv. Memory (RAM chips)
   v. peripheral connections/ports (parallel, serial, SCSI, etc.)

1 C. Memory and Secondary Storage

a. identify, name, and describe Secondary Storage Devices, including:
   i. floppy disks
   ii. hard disks
   iii. CD-ROM
   iv. optical and magneto-optical storage devices
   v. tape drives
b. recognize and use memory descriptors (KB, MB, GB)
c. describe proper floppy disk handling procedures and care
d. describe the structure and organization of Primary Memory-Random Access Memory (RAM): Conventional Memory, Upper Memory, Extended Memory, Expanded Memory
e. recognize the DOS limit of 640kb of Conventional Memory
f. distinguish between RAM and ROM chips (refer to BIOS, CMOS)
1 D. Input and Output

a. identify, name, describe, and distinguish between input and output devices:
   i. keyboard, pointing devices
   ii. scanners, digital cameras, video capture devices
   iii. monitors (CRT, LCD, projectors)
   iv. printers (various types)
   v. voice

b. explain the ways that computers communicate with each other:
   i. modem
   ii. networks

2. Operating a Microcomputer

a. distinguish between System Software, Utility Software and Application Software and describe the purpose of an operating system

b. differentiate among various operating systems, including DOS, Windows 95, Macintosh, and OS2

c. employ operating system(s) to perform basic operations of disk and file management:
   i. state the rules and conventions of DOS file naming
   ii. employ wildcards ? and * in filenames
   iii. identify legal and illegal DOS filenames (also refer to Windows '95 filename conventions)

   iv. distinguish between DOS Internal (basic commands in the DOS kernel) and External commands (commands that need to be accessed by a specific path)

v. describe, and employ basic commands to perform, file management functions: file listings with parameter variations; disk format (with system and without system); copy, rename, delete, undelete files; show content of .TXT (ASCII) files; make, change, and rename directories; distinguish between files and directories

vi. recognize a variety of file types and file extensions, including .EXE, .COM, .BAT,.SYS,.DRV, and .PRN

vii. describe the problem of computer viruses and steps to detect and clean files infected with viruses

viii. create a bootable emergency disk

d. demonstrate care, maintenance, and protection of computer equipment
3. Computers in Society

a. identify the effect of computers on their everyday lives (e.g., databases—subscription lists, ATMs, the Internet, computer record systems, income tax)
b. give examples of career opportunities related to computers
c. identify the current trends in computer technology
d. identify a range of purchasing considerations of an informed consumer, including but not limited to: warranty, service, licensing, needs assessment, market trends
e. identify and discuss ethical issues involving computers in society

4. Word Processing

a. perform basic operations of word processing:
   i. create a word processing document and save it to a specified disk and directory
   ii. select any amount of text and format the character attributes
   iii. format the indentation, alignment, and spacing of paragraphs
   iv. identify non-printing characters (space, tab, new line, new paragraph) as displayed on the screen
   v. move, copy, and delete text
   vi. insert a page break into a document
   vii. use footnotes/endnotes
   viii. use the find and replace functions
   ix. use the spellchecker/thesaurus
   x. insert a graphic into a document
   xi. set page margins
   xii. use headers and footers (including page numbering, filename, and date codes)
   xiii. preview and print a document
   xiv. recognize different document output devices (printers and faxes)
   xv. recognize that different file formats originating from different word processors may be incompatible, requiring file conversion routines
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   iv. identify non-printing characters (space, tab, new line, new paragraph) as displayed on the screen
   v. move, copy, and delete text
   vi. insert a page break into a document
   vii. use footnotes/endnotes
   viii. use the find and replace functions
   ix. use the spellchecker/thesaurus
   x. insert a graphic into a document
   xi. set page margins
   xii. use headers and footers (including page numbering, filename, and date codes)
   xiii. preview and print a document
   xiv. recognize different document output devices (printers and faxes)
   xv. recognize that different file formats originating from different word processors may be incompatible, requiring file conversion routines
5. **Spreadsheets**

   a. perform basic spreadsheet operations:
      i. enter and format data (numbers, text, data series)
      ii. create simple formulas (simple mathematical functions)
      iii. copy, fill, repeatable data and/or formulas
      iv. change cell characteristics (column widths, alignments, fonts, etc.)
      v. enter system date function, format headers/footers
      vi. preview and print in different orientations

   b. design a spreadsheet to predict outcomes based on specific parameters such as mortgages, investments, financial forecasting and planning

   c. create several kinds of charts based on spreadsheet data

6. **Databases**

   a. describe the structure of a database: records, fields, and key fields
   
   b. perform simple database procedures:
      i. design a form
      ii. enter, edit, and format data
      iii. examine, manipulate records in different views; delete and insert records; sort records in different ways
      iv. format, insert, move, hide and un-hide fields
      v. design, create, and print a report consisting of selected fields
   
   c. search and query a database for information based on specified parameters

7. **Graphics Applications**

   a. create and manipulate a graphic image
   
   b. differentiate between various bit-mapped and vector-based graphic file formats such as .BMP and .TIF
   
   c. compare graphics and character-based applications in terms of use of icons, menus, and WYSIWYG (What You See Is What You Get—vs. text)
8. Integration of Applications
a. combine data/files from various applications such as mail merge, importing spreadsheet data and charts into a document, inserting a graphic image

9. Communications
a. electronically access information from a remote source
b. electronically transfer messages and files
Appendix B: General References

Print Resources

CD-ROM Multimedia Learning Resources

Internet www Learning Resources/Support

Texts


(printbook, CD-ROM summary disk, extensive instructional support package, including test generation software)

*Computer Concepts—Illustrated, (The Illustrated Series)*, Parsons, June J. and Oja, Dan, Course Technology Inc. (Nelson Canada)

(based on Windows 95 interface but excellent general transferability of concepts and skills to previous versions of Windows; CD-ROM, www support)


(printbook and two CD-ROMs for interactive, multimedia learning)

*New Perspectives on Computer Concepts—(Brief, Introductory, or Comprehensive Editions)*. Parsons, June J. and Oja, Dan. Course Technology Inc. (Nelson Canada)

(different editions provide options in depth of coverage; excellent supplementary learning resources including www support and CD labs)


(customization in text content is possible)
Practical Skills Workbooks


(an excellent but very extensive workbook, including the development of basic skills in MS-Windows 3.1)

*Mastertrak Courseware*, Computer Courseware International (Phone: 1-800-668-1669)

*Microsoft WORKS 3.0 for Windows*, Kelly, Christopher M., Course Technology Inc. (Nelson Canada)

*Microsoft Works 3.0 for Windows*, O'Leary, McGraw-Hill

*Microsoft Works 3.0 for Windows Illustrated*, Halvorson, Michael, Course Technology Inc.

*Using Microsoft Works 3.0 for Windows*, Frederick, Vivian and Yasuda, Phyllis, McGraw-Hill

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Appendix C: The Computer Studies IRP

The ABE Computer Studies Outcomes Workteam was formed as a sub-committee of the Computer Studies Working Committee in January 1996 to elucidate the measurable learning outcomes for the Advanced Level Computer Studies course. Colleagues throughout the system reviewed the listed outcomes. Their feedback was incorporated into the list of outcomes presented to the ABE Computer Sciences Working Committee for ratification in February 1996.

In March and April, 1996, a cadre of 6 instructors met for 7 days on Bowen Island to write instructional and assessment strategies and identify resources to address the learning outcomes. Among the instructors were ABE Computer Studies instructors from the University College of the Cariboo, Vancouver Community College, Capilano College, Kwantlen University College, and the Open Learning Agency.

The Draft IRP was field tested throughout 1996/97 and revised in May 1997.

The Advanced Level Computer Studies IRP is a working draft document. As such, it will be reviewed and revised on an ongoing basis throughout its lifetime. The review and revision process is facilitated by several mechanisms, among them, annual review by the Computer Studies Working Committee, and ongoing review (mediated by the Internet) by computer studies instructors throughout the province.
Appendix D: Acknowledgments

COMPUTER STUDIES OUTCOMES WORKTEAM MEMBERS: Don Bentley, Capilano College; Frank Fornelli, Vancouver Community College; Victoria Pitt, College of New Caledonia; Bryan Richards, University College of the Cariboo.

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AAAP ADVISORY COMMITTEE MEMBERS: Cheryl Dill (ABE Steering Committee), Jack Doan and Bruce Meldrum (BC Association of Vocational Administrators), Shirley Holloway and Brian Carr (BC Deans of Technology), Adrian Kershaw and Susie Safford (BC Deans and Directors of Developmental Education Programs), Dale Dorn (Senior Instructional Officers Committee), Kent Yakel (BCIT), Dave Griffiths and Norma Kidd (MEST), and Earl Bloor (AAAP Manager) and Dennis Anderson (Centre for Curriculum, Transfer and Technology).