

**ASSESSMENT TOOLS IN  
CAREER AND TECHNOLOGY STUDIES (CTS):  
REVISED CHECKLISTS AND RATING SCALE  
FOR THE INFORMATION PROCESSING STRAND**

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## Abstract

This research project is a validation study of assessment methods currently used within a new curricular initiative in Alberta. The Career and Technology Studies (CTS) curriculum was developed by Alberta Education to replace the Practical Arts program and is presently being implemented in secondary schools throughout the province. Although some schools have recently adopted parts of the program on an optional basis, the CTS curriculum will be fully implemented in the Fall of 1997. During the elective implementation period for CTS, Alberta Education has been developing and validating curricular content as well as assessment methods for this cross-discipline, levels-organized, competency-based, and student-centered program. Assessment panels have been charged with the tasks of designing and validating assessment tools.

Curricular content of courses within the subject areas of business education, home economics, industrial education, and vocational education are now represented within the structure of the CTS curriculum. The CTS content is organized into 22 strands ranging from Agriculture to Wildlife and spanning Forestry to Information Processing. The content in each strand is packaged into learning modules ranging between 8 to 49 modules with a total of over 600 modules in CTS. Teachers, with student input, select modules of study to be completed within an average 25-hour time frame. Modules are organized according to three levels of mastery, denoted as introductory, intermediate, and advanced. Curriculum Standards documents outline competencies for students to demonstrate in each module at each of the three levels.

The CTS curriculum documents recommend that teachers use various assessment methods to evaluate students' progress through the modules. These assessment tools were designed to promote uniformity among teachers when measuring student performance and include rating scales and checklists.

The current research project analyzes and presents revised versions of Alberta Education's proposed competency level rating scale and checklists at the introductory and intermediate levels of the spreadsheet and database modules in the Information Processing strand. The revised instruments will be submitted to Alberta Education for consideration by an assessment panel involved in an on-going validation process.

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## Introduction

### Career and Technology Studies

Career and Technology Studies (CTS)<sup>1</sup> is a new program that has been developed for secondary schools in Alberta (Alberta Education, 1989b). The CTS curriculum was designed to create opportunities for junior and senior high school students to obtain procedural knowledge and to apply their newly acquired expertise in a spirit necessary to approach an ever changing world. Fisher (1994) highlights the features of the CTS curriculum in Alberta as “a *student-centered, cross-discipline, levels-organized, competency-based program*” (p. 9). Additional CTS curriculum details<sup>2</sup> including curriculum development, curriculum implementation, student assessment, and validation procedures are included in the appendices section.

### Curriculum Development

The CTS curriculum will replace the existing Practical Arts program (Alberta Education, 1989b) that consists of four separate content areas including business education, home economics, industrial arts, and vocational education. Alberta Education began an inquiry into restructuring the Practical Arts Program in September 1988 by establishing the “Practical Arts Project” (Alberta Education, 1989a) and this action was based on several position papers that were generated both internally and externally. The need to redefine the future direction of the practical arts program resulted from evolving changes in society, technology, and subject matter (Alberta Education, 1989c). The research efforts of the Practical Arts Project led to the establishment of the Career and Technology Studies curriculum (Alberta Education, 1989b). All practical arts courses offered in Alberta schools will be replaced by the Career and Technology Studies curriculum in September 1997 (Alberta Education, 1994b).

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<sup>1</sup>CTS terms appearing for the first time in the body of the text are italicized and are defined in Appendix B.

<sup>2</sup> Appendix A outlines the development of the CTS curriculum. Appendix B is a glossary of terminology used in CTS.

### Curriculum Implementation

The CTS curriculum is organized into 22 distinct content areas called *strands* (see Appendix C). Content in the CTS strands includes the former Practical Arts courses as well as several new areas of study, such as Tourism Studies, Logistics, and Enterprise and Innovation (see Appendix D). Each strand consists of a number of individual *modules*, representing 25 hours of study for the average student, ranging from 8 to 49 modules. For example, the Information Processing strand has 43 modules (Alberta Education, 1994a, p. B.5). There are over 600 modules of study among the 22 strands of the CTS program (Alberta Education, 1994b, p. C.5).

Depending upon school-based decisions relating to the organization and offering of modules within strands, students can potentially “mix and match” individual modules to create their own *courses*. For example, a student may package a six-credit course by taking two modules from Information Processing, three modules from Management and Marketing, and one module from Enterprise and Innovation. Credit towards a high school diploma would be attained when this particular student could demonstrate the necessary *competencies* for each module. Students who have the opportunity to choose their own modules and design their own courses have the freedom to explore areas of interest as well as gain skills for employment. By the fall of 1997, which is Alberta Education’s mandatory implementation date, the Career and Technology Studies curriculum has the potential of representing about one third of the credits needed for a high school diploma.

### Student Assessment

Teachers will now have the opportunity to measure the competence level of their CTS students by using the evaluation instruments, processes, and standards identified by Alberta Education (1994b). Alberta Education (1995c) released a document that describes the need for a common set of *Assessment Tools* for each module within strands and outlines principles required to establish *Assessment*

*Standards* in CTS. According to this document (p. A-3), a competency based curriculum has three parts:

1. ***Curriculum Standards*** - describe what a student must know and is able to do in order to be successful in a particular module.
2. ***Assessment Standards*** - define how the student's performance will be judged.
3. ***Achievement Standards*** - describe how many students across the province will achieve a particular standard.

Alberta Education (1995c) describes how assessment standards are designed to “provide a consistent measure of what was expected to be measured” (p. A-3). The assessment tools have been developed by Alberta Education, distributed to schools, and made available to teachers in order to assist them in assessing student performance on a more uniform basis.

Students gain credit in CTS by successfully completing individual modules of study in one or more strands. Curriculum and Assessment Standards documents outline the required knowledge, skills, and attitudes (*KSA 's*)<sup>3</sup> that students must acquire and demonstrate (Alberta Education, 1995b). In these documents, Alberta Education has provided teachers with Module Learner Expectations (*MLE 's*) and Specific Learner Expectations (*SLE 's*) to focus student learning activities. *MLE 's* identify the *exit-level competencies* that students must demonstrate for *successful completion* of a module and *SLE 's* provide a detailed framework for instruction and learning. Assessment tools identify the competency processes and products that students must acquire and demonstrate in order to successfully complete a module.

Some of the assessment tools are specific to a particular strand or module, while other tools are generic to most or all of the CTS curriculum. In addition, although a current checklist for the Agriculture strand is specific to that strand, it still incorporates a standard 4-point rating scale that is used in all other strands. In addition, teachers can use identified *exemplars* or *reference sets* in order to assist them to decide if a student's work is at an acceptable level or *standard*, above

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<sup>3</sup> See Appendix C.



standard, or not yet at standard. Other tools include *assessment checklists* and a *competency level rating scale* (see Appendix F and G).

Alberta Education (1996a) has released an interim competency level rating scale as one aspect of the assessment tools to help teachers evaluate students' progress through the CTS modules. The scale presents a continuum of numbers ranging from zero to four. Students must demonstrate their competency at specifically identified tasks, which have been included on checklists, in order to be assigned an appropriate number on the scale. For example, the competency level identified in the rating scale is used to assess students' ability to conduct research, create reports, and make presentations.

The rating category that describes a particular competency level depends on the degree of difficulty in the module. Alberta Education (1994b, p. C-6) denotes three modular levels of mastery as *introductory*, *intermediate*, and *advanced*. For example, a rating of 1 is "at standard" for introductory modules. A 2 or higher would be assigned to students whose work is "above standard." In intermediate modules, "at standard" is a 2, while a 3 or 4 would be used to designate "above standard." For the advanced level, the standard is 3 and a 4 is designated "above standard." Alberta Education (1995c) has also identified expected standards for knowledge, skills, and attitudes (KSA's) within individual modules. For instance, at the advanced levels the KSA's would reflect entry-level workplace expectations, whereas at the introductory level the KSA's would reflect a personal-use focus (see Appendix C).

#### Validation Procedures

Alberta Education is currently involved in on-going validation procedures. At present, assessment panels are finalizing and validating MLE's and assessment tools (Fisher, 1994, p. 25). Two documents that describe the need to develop and validate *assessment standards* have been circulated to teachers in Alberta. The first document (1994c) entitled, Developing and Validating Assessment Standards in Career and Technology Studies: Moving Towards a Results-Based Curriculum, was the result of work completed by an assessment panel comprised of teachers. A second paper

(Alberta Education, 1995c) called, Assessing Student Achievement in Career and Technology Studies, expanded the procedures involved in establishing parameters for validation of student achievement in CTS. These two documents established the validation procedures for assessment tools used in the CTS curriculum.

Currently, draft assessment instruments for strands are being field tested by teachers in numerous schools throughout the province. The assessment tools in various CTS strands are likely to be revised before the mandatory implementation date of September 1997. For instance, Alberta Education (1996a) has revised the assessment tools used in Information Processing four times since the strand was introduced on an optional implementation basis in the 1994-1995 school year. Assessment tools were originally designed by Alberta Education to provide uniformity for teachers evaluating student performance in the multi-faceted CTS program. Once the assessment tools are validated, teachers use valid evaluation instruments to assess the performance of their students in a more meaningful and confident manner.

### Current Research Study

This research project is a validation study of assessment methods currently used within the CTS curriculum. The objective of the project is to determine if Alberta Education's Module Learner Expectations can be measured effectively by using the assessment tools prescribed for teachers in the Introductory and Intermediate levels of the Spreadsheet and Database modules (see Appendix E) of the Information Processing strand. This study will focus specifically on a rating scale and checklists, as two types of assessment tools, that have been developed to measure student competence in these four modules.

This validation study involves four parts. First, recent and relevant literature on alternative assessment, checklists, and rating scales will be explored. Second, Alberta Education's proposed introductory and intermediate competency level rating scale and proposed checklists will be examined. Third, a revised rating scale will be presented and the content validity of Alberta Education's proposed checklists will be

considered. After this process of qualitative validation, the checklists will be revised. The fourth step involves submitting the revised assessment instruments to Alberta Education for consideration by an assessment panel involved in an on-going validation process.

### **Review of Literature**

The purposes of this section are to define relevant terms and to review recent literature related to alternative assessment, rating scales, and checklists. The characteristics of rating scales and checklists, as alternative forms of assessment, will be outlined. A summary of the theory underlying rating scales and checklists will prove useful for designing valid alternative assessment instruments.

#### Alternative Assessment

Herman, Aschbacher, and Winters (1992) have suggested that any other type of evaluation that is not multiple-choice testing is within the realm of alternative assessment. These researchers considered alternative assessment as a variant of performance assessments, which require students to create rather than choose a response. Herman et al. (1992) assert that “performance assessment requires students to actively accomplish complex and significant tasks, while bringing their prior knowledge, recent learning, and relevant skills to solve realistic or authentic problems” (p. 2). Performance assessments provide the theoretical basis for alternative assessment. Examples of alternative assessments include observations, journals, portfolios, written responses, oral responses, and demonstrations.

In the assessment tools documents, Alberta Education (1996a) suggests the use of various approaches to measure or evaluate student progress and competency development. Alternative assessment is part of the evaluation techniques prescribed in the CTS curriculum, including the Information Processing strand. Teachers can combine the written and oral responses of their students with observations of student demonstrations as forms of alternative assessment. For example, teachers may use

Alberta Education's checklists and a rating scales to observe students demonstrating certain formatting techniques required in the introductory spreadsheet module.

### Checklist

A checklist consists of a list of statements about behaviors that teachers expect to be exhibited by students. Cartwright and Cartwright (1984) state that "checklists provide an efficient means of recording the presence or absence of specific behaviors in given situations" (p. 84). Raters are required to offer simple yes or no judgments about the presence of characteristics included on a checklist.

Gronlund and Linn (1990) recommend that designers of checklists should "arrange the desired actions in the approximate order in which they are expected to occur" (p. 393). These researchers suggest that individual behaviors that comprise a desired action are more easily observed than the entire action itself, although both of these may be noted on a well-designed checklist. A checklist may outline each specific step in a particular process, as well as provide the criteria for the finished product. Gronlund and Linn's assertions regarding checklist design involve those teachers using checklists to evaluate students enrolled in CTS modules. For example, a teacher using a checklist in the Information Processing strand may observe a student's ability to demonstrate individual procedures necessary for creating a spreadsheet, as well as examine the overall appearance and function of the student's formatted chart.

### Numerical Rating Scale

According to Sax (1989), a rating scale that assigns numbers to descriptively ranked categories is called a numerical rating scale. Each category on a numerical rating scale is identified with a description of a particular behavior or characteristic. The numbers on a rating scale identify several ranked categories. Categories are easily distinguished from each other because the descriptions outline varying degrees to which a certain characteristic is present. A teacher using a numerical rating scale can simply be instructed to use the largest number on a scale to indicate the highest

representation of a particular behavior and to use the lowest number to denote the lowest instance of that behavior. In between the highest and lowest numbers are intermediate values that indicate the presence of a characteristic in varying degrees. For example, Alberta Education's (1996a) competency level rating scale designed for the Information Processing strand measures the extent to which students can demonstrate certain techniques with varying amounts of assistance required from a teacher. This numerical rating scale has five rankings ranging from a high of 4 to a low of 0. The numbers between 4 and 0 indicate degrees of teacher assistance required by students to demonstrate particular techniques.

Gronlund and Linn (1990) outline several characteristics of effective numerical rating scales. Most importantly, these researchers note that the points on a scale should be clearly defined. Errors in rating occur when vague task or behavior characterizations are used. In order to reduce errors in rating, the points on the scale must be adequately identified and easily distinguishable. Sax (1989) stresses the importance of descriptions attached to numerical scales. He maintains that the words defining a category on a rating scale are often more important than the category itself. A rating scale that uses vague terms to evaluate behaviors such as "moderately pleasant" or "somewhat active" are less likely to be rated reliably than specific terms like "frequently active," "occasionally active", and "rarely active" that can be somewhat more qualified.

A rating scale "can be constructed to focus the attention of the observer on specific and relevant aspects of behavior" (Sax, 1989, p. 147). Alberta Education has designed a rating scale for use within the Information Processing strand to identify the degree to which students demonstrate tasks outlined in the MLE's. Teachers observing students at work are able to assess the process or procedures demonstrated by a student, as well as the product created by a student (Alberta Education, 1995c, p. A-3). Students are assigned a number from the rating scale by teachers to indicate the degree to which the task was achieved by students. In the Information Processing strand, tasks are listed on checklists. Cartwright and Cartwright (1984) state that rating scales are used whenever it is appropriate to the purpose for which the

observation is being made and where it is possible to determine the extent to which a particular quality is present. These authors further explain that a rating scale may be thought of as an extension of a checklist in that the behaviors to be observed are listed and an opportunity is provided to indicate the degree to which the frequency of a behavior occurs and there is an opportunity to indicate the quality characteristics of the performance. Gronlund and Linn (1990) explain that a checklist is similar in appearance to a rating scale. The difference between the two is the kind of judgment required. A checklist calls for a simple yes or no judgment. By contrast, a teacher using a rating scale can indicate the “degree to which a characteristic is present or the frequency with which a behavior occurs” (p. 392).

Gronlund and Linn (1990) submit that numbers on a numerical rating scale are vaguely defined, and so the interpretation and use of the scale may vary. Messick (1994) reinforces Gronlund and Linn’s submission by stating that “in contrast to multiple choice, alternative modes of assessment afford varying degrees of openness in the allowable responses” (p. 1). Any teacher presently using the rating scales in CTS modules has the responsibility to interpret students’ work in a subjective manner, although objectivity should be paramount.

Feldt and Brennan (1993) assert that no one operates at his or her personal best on all occasions either in the domain of physical activity or mental activity. Teachers attach meaning to the events occurring in the CTS classroom through observation and interaction with the students. Through the subjective judgment of the teacher, the process and product of the student is interpreted and transformed into a number represented by a category on the numerical rating scale.

### **Alberta Education’s Proposed Rating Scale and Checklists**

This section of the current research project provides an analysis of the rating scale and checklists that Alberta Education is proposing to use within the introductory and intermediate levels of the Information Processing strand. Rating scales have been designed to provide a measure of how well students demonstrate certain behaviors or tasks outlined on checklists. As assessment tools, the rating

scales and checklists are to be used together to assess the competency levels of students demonstrating certain techniques outlined in the MLE's.

Analysis of Alberta Education's Proposed Competency Level Scale

Alberta Education calls the numerical rating scale used in the introductory and intermediate levels of the spreadsheet and database modules of the Information Processing strand a *competency level* scale. An example of the scale has been provided in Figure 1. After careful analysis, this researcher discovered four interesting aspects of Alberta Education's competency level scale.

Figure 1 Alberta Education's Proposed Competency Level Scale.<sup>4</sup>

4. <u>Consistently</u> demonstrates <u>all</u> of the designated techniques efficiently without prompting.	3. <u>Usually</u> demonstrates <u>all</u> of the designated techniques efficiently, <u>seldom</u> needs prompting.	2. <u>Generally</u> demonstrates <u>most</u> of the designated techniques, seldom needs prompting.	1. Can demonstrate designated techniques, but occasionally needs prompting.	0. Cannot demonstrate designated techniques.
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First, each category on the rating scale, except for competency level 0, seems to require teachers to measure more than one behavior at the same time. The scale appears to describe both the competency level of a student demonstrating all or most of the designated techniques, as well as the amount of prompting the student received from a teacher. For example, the verb “demonstrate” included at the beginning of each rating scale category may not have to be modified by adverbs such as “consistently”, “usually”, and “generally”, when the amount of prompting offered by teachers has been included at the end of each rating scale category (see Figure 1). Teachers attempting to measure two tasks at the same time may experience confusion due to a lack of clear discrimination among individual rating categories.

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<sup>4</sup>From Alberta Education. (1996a). Information Processing Assessment Tools (Revised). Edmonton, AB: Alberta Education, Curriculum Standards Branch.

Second, the descriptive categories in competency levels 2 and 3 appear to overlap (see Figure 1). It is the opinion of this researcher that teachers using the competency level descriptors may have difficulty differentiating between categories 2 and 3. Words chosen to describe these two categories seem to be indistinguishable. Teachers may not be able to readily differentiate between “usually” and “generally” as these terms relate to student performance.

The third area of concern with Alberta Education’s competency level descriptors is the order of categories. The competency level is presented with 4 on the left-hand side and 0 on the right-hand side. Since competency level 0 characterizes a lack of the skills to be measured and competency level 4 denotes the most of the skills to be measured, the rating scale, like numerous other scales should ideally be sequenced from left to right. Viewing the rating scale from left to right is consistent with the conventional method of assigning smaller numbers to the left of a graph and assigning larger numbers to the right of a graph.

The last item of interest with Alberta Education’s competency level scale has to do with application of the scale. A lack of detailed instruction to guide teachers using the rating scale was observed (see Appendix F and G). This absence of direction does nothing to ensure that the scale will be applied uniformly by teachers.

#### Analysis of Alberta Education’s Proposed Checklists

Alberta Education’s checklists were designed to be used meaningfully and confidently by teachers. Tasks, or competencies listed on the checklists were adopted from the MLE’s. Checklists serve as a guide for teachers when assessing students’ competency development in modules from the Information Processing strand. After analyzing Alberta Education’s checklists used in the introductory and intermediate levels of the spreadsheet and database modules, this researcher noted three observations.

First, some items on the checklists require teachers to observe the presence or absence of more than one behavior at the same time. These “double-barreled” items are difficult, if not impossible for teachers to apply consistently and uniformly in



student assessment. For example, under the heading “Formatting Functions” of the introductory spreadsheet assessment checklist, Alberta Education has grouped various ways for students to format numbers. The four types of formatting, which include percentages, dollar amounts, commas, and decimals, have been included on the checklist as one item (see Appendix F). Ideally, the four methods used to format numbers should appear individually on the checklist, rather than as a grouping. Teachers would be more effective to observe each type of formatting individually and then record the presence or absence of the procedure as one specific item on the checklist. If a student has difficulty demonstrating one type of formatting, then the teacher could direct the student to engage in activities designed to master that technique.

Another example of a double-barreled item is found on the “Proofreading/Editing/Search” section of the introductory database assessment checklist (Alberta Education, 1996, p. INFDB), which requires teachers to observe students modify records (see Appendix G). Under this particular item on the checklist, there are a number of tasks also included. Teachers are more capable raters if only one task is to be observed at one time, rather than multiple tasks at the same time. If effective and consistent measurement is desired, each of these specific tasks should be presented on the checklist as discrete items, rather than grouped together as one item.

Second, some of the categories on the checklists may prove challenging for teachers to observe and then to rate with the competency level scale. For instance, teachers may not readily detect some of the tasks listed under the “Solving Problems” category (see Appendix G). The criteria and parameters for the problem solving section have not been included on the checklist. Teachers may have difficulty in attempting to discern and rate how well a student has planned, designed, and created databases to solve problems and to make decisions. Another formidable task for a teacher is to apply the rating scale to represent how well students have analyzed data to draw conclusions and make recommendations.

The fourth area of interest with respect to Alberta Education’s checklists is the lack of instruction provided for teachers using this assessment tool. The rating scale and checklists are to be used together. Detailed directions have not been provided for teachers to follow in order to apply the rating scale to checklist items. This absence of direction does nothing to ensure that teachers will apply the rating scale to the checklists in a uniform manner.

### **Recommended Revisions**

As assessment tools, Alberta Education’s rating scale and checklists for the introductory and intermediate spreadsheet and database modules were originally designed to be used meaningfully and confidently by teachers. Part of the current research project is to revise Alberta Education’s proposed rating scale so that interpretation and application will result in more uniformity in evaluation by teachers. Several changes to Alberta Education’s proposed assessment tools are recommended in order to enhance the design of a new rating scale for application to categories on revised checklists. Details of the revisions to the rating scale and to the checklists are presented in the next sections.

#### Revised Rating Scale

Six revisions to Alberta Education’s proposed competency level scale have been recommended by this researcher. These suggestions have been used to design a revised rating scale. An example of the revised rating scale has been provided in Figure 2.

Figure 2 Revised Rating Scale.

0) Cannot demonstrate the designated technique.	1) Can demonstrate the designated technique, but frequently needs prompting.	2) Can demonstrate the designated technique, occasionally needs prompting.	3) Can demonstrate the designated technique, rarely needs prompting.	4) Can demonstrate the designated technique efficiently, without prompting.
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Each category on a numerical rating scale should classify a single behavior, as identified in the review of literature section. The wording was changed on the revised rating scale to allow categorical descriptions to appear in singular, rather than plural form. For example, all of the existing terms that referred to “designated techniques” have been changed to “designated technique” (see Figure 2). In addition, a generally accepted continuum, using the conditions “frequently, occasionally, rarely, never” was incorporated into the rating scale (see Figure 1) to replace the somewhat more ambiguous scale that uses the terms “occasionally, seldom, seldom (sic), without prompting.”

Secondly, the confusion that arises from overlapping categories in the use of such adverbs as “consistently”, “usually”, and “generally” to modify the verb “demonstrate” may be eliminated by replacement with the word “can” (see Figure 2). With the revised rating scale, a teacher may observe students demonstrating certain competencies with respect to the amount of assistance required. For example, a student who consistently demonstrates competency in order to perform a specific task should be awarded a 4 from a teacher using the revised rating scale. If another student requires occasional assistance to perform the same task, then that student should earn a 3 from a teacher utilizing the same rating scale. This proposed rating scale may assist teachers to more uniformly observe individual competencies demonstrated by students.

A third proposal involves reversing the order of the scale’s presentation. The rating scale should be displayed for teachers with the 0 category at the left and with the 4 category at the right (see Figure 2). The scale sequence now matches the normal left to right flow, making it easier for teachers to comprehend and follow.

The fourth suggestion has to do with the name of the scale. It is recommended that the numerical rating scale be identified as a “rating scale” rather than “competency level.” Although the rating scale measures varying degrees of competency levels, the term “rating scale” seems to be a more widely used reference in measurement literature. Teachers may already be familiar with using other rating scales for educational measurement. Referring to the rating scale with a standardized

name may assist teachers to identify more readily with terminologies and processes they may have encountered previously.

Fifth, the revised rating scale was extracted from the bottom of Alberta Education's proposed checklist and replaced at the top of the revised checklist (compare Appendix F to Appendix H). In the opinion of this researcher, the rating scale is now positioned for easier reference by teachers. The categories should be read before teachers apply ratings to checklist items.

The sixth recommendation for the revised rating scale involves more detailed instructions for teachers. The revised rating scale now incorporates directions for use. Instructions have been inserted at the top of the checklist, directly above the new position of the rating scale so that the information is now sequenced in the logical order that it will be used by teachers. Teachers may now read the instructions and become familiar with the rating scale before the rating scale categories are applied to checklist items.

### Content Analysis of Checklist

A significant part of the current research study is to establish evidence of content validity with the checklists. Substantiating the validity of a checklist, as one form of alternative assessment, would involve determining if the instrument measures what was expected to be measured (Alberta Education, 1995c). Alberta Education designed the rating scale and checklist to be valid measures of the identified MLE's.

Messick (1994) advises that the same standards of validity apply to all the alternative assessment modes. These standards are addressed in many types of validity, including evidence of content-related validity. The checklists used in the Information Processing strand of CTS are currently being validated by teachers throughout Alberta. In order to discern the presence of content-related evidence of validity, this researcher approached the validation process in three steps.

The first phase of validation included obtaining the latest copies of all relevant documents from Alberta Education. After acquiring updated drafts of the Curriculum and Assessment Standards (1995b) and the Assessment Tools (1996a) for

the Information Processing strand, this researcher focused on the introductory and intermediate levels of the spreadsheet and database modules. The MLE's for each of the four modules was examined in relation to the corresponding items on the checklists. Although the assessment tools continue to be developed and revised, the MLE's have been established for the time being.

According to an Alberta Education program consultant<sup>5</sup>, the Information Processing strand has been "closed" until the Spring of 1997 with respect to adding or reviewing existing curricular content to the strand. Now that the MLE's have been established, the rating scale and checklists must be examined to determine if they measure what they were designed to measure. Once a thorough understanding of the expected outcomes was obtained, it was possible for this researcher to embark upon the second phase of validation.

Second, the checklists were examined for the presence of competencies stated in the MLE's and SLE's for the same modules. This researcher attempted to determine if such a matching relationship existed. In order to examine the content-related evidence of validity, each item on a checklist was verified to determine if it pertained to those competencies and skills documented by Alberta Education (1995b) in the Guide to Standards and Implementation (GSI). The items on checklists (see Appendix F and G) appeared to correlate with the MLE's outlined in each of the four pertinent modules (Alberta Education, 1995c).

Third, apparent omissions or oversights on the proposed checklists were added to the revised checklists. While no omissions were evident, the most prevalent example of items that were revised related to "double-barreled" statements. These statements were simplified on the revised checklists.

As a result of carefully noting the accuracy of competencies listed on the checklists, this researcher verified of the presence of content-related evidence of validity. The expected Modular Learner Expectations and Specific Learner Expectations for the Introductory and Intermediate Spreadsheet and Database modules are represented on the revised checklists with valid statements. The revised

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<sup>5</sup> S. deWijk, personal communication, October 30, 1995.

observation instruments identify competencies in designated modules and can be used effectively with the revised rating scale.

### Revised Checklists

After following the requisite steps in a process of content analysis validation, this researcher recommends six modifications to Alberta Education's proposed checklists. These suggestions have been used as a basis for revising the checklists. Examples of the new checklists have been provided in Appendices H, I, J, and K.

The first modification involves the addition of directions to the checklists and these instructions now provide a guide for teachers. The section for instructions has been inserted at the top of the checklist, directly above the new position of the revised rating scale (see Appendix H). Teachers can become familiar with the instructions in order to apply the rating scale to individual checklist items.

Second, the columns on Alberta Education's proposed checklists that denote the minimum competency level for an "at standard" performance by students in the introductory and intermediate modules for spreadsheet and database are absent on the revised checklists because Alberta Education (1995b) has identified the minimum competency levels for modules in the Assessment Criteria and Conditions (ACC) column of the updated Curriculum and Assessment Standards documents for the Information Processing strand. Teachers use the Curriculum and Assessment Standards documents to plan for instructional delivery and teachers should be aware of the minimum competency levels for introductory and intermediate modules. In the opinion of this researcher, an additional notation on the checklist form to indicate minimum competency levels may serve as a reminder for teachers, but is a duplication of information that exists elsewhere.

Third, the section on problem solving was removed from the checklist (compare Appendix G with Appendix J.). Teachers may potentially face difficulty when rating items included in the problem solving category, due to of a lack of guidelines provided as a reference. Currently, the checklists outline observable competencies that students must demonstrate. In the opinion of this researcher, the

ability of students to execute appropriate psychomotor activities while demonstrating expected competencies to achieve a task is a much different endeavor than trying to differentiate the degree of difficulty in various problem solving applications.

Students must first demonstrate the manipulative competencies that may then serve as a basis for problem solving activities. For example, a student must learn how to create a spreadsheet by following individual steps. Once students have demonstrated competence with spreadsheet fundamentals, then embarking upon solving application problems using spreadsheets as a tool becomes possible. Perhaps attempting to differentiate problem solving activities is more appropriate for the intermediate or advanced level of study and if this notion is deemed appropriate and desirable, a separate section could be developed that clearly delineates expected levels of application or problem-solving difficulty.

Fourth, the items within checklist categories that were “double-barreled” were identified and modified. Tasks that were clustered together as groups were separated into individual items because it may be more difficult logically for a teacher to effectively judge the absence or presence of two or more behaviors at the same time. Therefore, in order to make the teacher’s role as observer more effective, grouped tasks or behaviors on checklists were split into separate items so that an individual behavior or task is now evaluated as one item. As a result, the revised checklists identify more individual items than previously presented on Alberta Education’s original versions.

As a fifth alteration, separate revised checklists were generated, one checklist for the introductory module and one checklist for the intermediate module. Although the checklists have been separated for the particular competency level, these forms are essentially the same with respect to layout. For example, the introductory and intermediate modules for database have a similar design in that the same categories and competencies are listed on both forms (see Appendix J and Appendix K). Items for the intermediate level that represent additional features or procedures beyond the introductory level are bolded on the checklists (see Appendix I and K). Once a teacher becomes accustomed to using the introductory module checklist for a

particular module, then the intermediate checklist would also be familiar to teachers due to similarities in design.

The last new feature for the proposed checklists is the provision of a grade summary. A space to record overall averages, as well as a module grade, at the bottom of the form (see Appendix H) may prove useful for teachers' grading purposes. Teachers determine student's averages for each of three separate sections on the checklists and may now record the overall averages for the major sections on the same form, as well as a module grade.

### **Conclusion**

This research project was a validation study of assessment methods currently used within the CTS curriculum. The goal of the project was to determine if Alberta Education's Module Learner Expectations, as identified in Curriculum and Assessment Standards documents, could be measured effectively by using the assessment tools prescribed for teachers in the Introductory and Intermediate levels of the Spreadsheet and Database modules of the Information Processing strand. The specific focus of the research study dealt with rating scales and checklists, as two types of assessment tools, that have been developed to measure student competence in these four modules. The research project presented a validation study in several sections.

This researcher examined Alberta Education's proposed competency level rating scale and proposed checklists in light of recent and relevant literature on alternative assessment, checklists, and rating scales. Based upon an examination of Alberta Education's proposed competency level rating scale, a revised rating scale incorporating a number of recommendations, including instructions for use, was presented. Then, the content validity of Alberta Education's proposed checklists was considered. As a result of a thorough examination of the checklists, the evidence of content-related validity was determined. After this process of qualitative validation, the checklists were revised and several recommendations were presented.



The revised rating scale and checklists from the current research study were submitted to Alberta Education on March 18, 1996 (see Appendix H, I, J, and K). This submission, along with input from many teachers involved in field testing throughout Alberta, is to be considered by an assessment panel charged with the task of designing and validating assessment tools for use in the Information Processing strand. This researcher's attempts to redesign a rating scale and to establish content validity for four checklists are the first steps in a process of validation.

### Prospects for Future Research

This project raises issues that could provide the basis for further research in the areas of validation and assessment. An attempt to validate assessment tools designed to measure competence in the CTS modules should draw from both qualitative and quantitative research methods; a strong research design should draw from both paradigms. The qualitative side of this research involved establishing the validity of two measurement tools. Not only did this research project offer a revised rating scale, but it also analyzed checklists for content-related evidence of validity with respect to measuring the learning objectives developed by Alberta Education.

Additional research could focus on a further validation study designed to provide the quantitative portion of research in which criterion-related evidence of validity could be determined. Criterion-related evidence of validity could be established by determining meaningful comparisons of evaluation methods.<sup>6</sup> The comparison of test results with observations recorded on the checklists could provide the basis for this type of validation study. The convergence of qualitative and quantitative research methods applied to these rating scales and checklists will add to the integrity and confidence of these assessment tools. Once the validity and reliability of the tools have been firmly established, teachers will have confidence that the assessment tools measure the multi-faceted CTS module expectations.

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<sup>6</sup> Sax (1989) states "criterion-related validity refers to the correlation between test scores and an external criterion" (p. 295).

CTS modules are offered in junior and senior high schools in Alberta. Junior high students are able to “bank” credits earned in introductory modules and may challenge, rather than repeat, those modules once they reach high school in order to enroll in the next successive level (Alberta Education, 1995a, p. 2). High school teachers developing *challenge procedures* must determine how best to evaluate junior high students’ previously mastered competencies. Teachers may choose to use the revised assessment tools from the current study as a guide for evaluating junior high students. The revised rating scale and revised checklists may form a basis for challenge procedures involving the Introductory and Intermediate levels of the Spreadsheet and Database modules in the Information Processing strand or it may be determined that modified assessment instruments may need to be developed and validated.

Other research may focus on statistical analyses based on data made available from using the revised rating scale and checklists.

## References

- Alberta Education. (1989a, May 29). Trends and issues affecting Practical Arts in Alberta Secondary Schools (Practical Arts Project). Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1989b, June 1). Proposed directions for change for practical arts programs in secondary schools in Alberta (Practical Arts Project). Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1989c, June 6). A status report on the Practical Arts programs within Secondary Schools in Alberta (Practical Arts Project). Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1992, October 27). Career and Technology Studies: Building for the Future. Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1994a, May 31). Career and Technology Studies: Information Processing - Guide to Standards and Implementation. Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1994b, May 31). Career and Technology Studies: Program of Studies. Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1994c, June 17). Developing and validating assessment standards in Career and Technology Studies: Moving towards a results-based curriculum. Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1995a, March). Career and Technology Studies in junior high. Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1995b, May 15). Curriculum and Assessment Standards - Information Processing Strand. Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1995c, August). Assessing student achievement in Career and Technology Studies. Edmonton, AB: Alberta Education, Curriculum Standards Branch.
- Alberta Education. (1996a, February). Information Processing assessment tools (Revised). Edmonton, AB: Alberta Education, Curriculum Standards Branch.

- Alberta Education. (1996b, June). Implementation schedule for Career and Technology Studies (Revised). [On-line]. Available: [http://ednet.edc.gov.ab.ca/level5/cts\\_implementation.html](http://ednet.edc.gov.ab.ca/level5/cts_implementation.html) (July 12, 1996).
- ✓ Cartwright, C. A., & Cartwright, G. P. (1984). Developing Observation Skills (2nd ed.). New York: McGraw-Hill.
- ✓ Feldt, L. S., & Brennan, R. L. (1993). Reliability. In Robert L. Linn (Ed.), Educational Measurement (3rd ed.). Phoenix, AZ: Oryx Press.
- Fisher, H. M. (1994, July 26). Career and Technology Studies: The Business Education Program in Alberta, Canada. Paper presented at the meeting of International Society for Business Education, Oslo, Norway. [On-line]. Available: <http://www.edu.uleth.ca/faculty/members/fish.pg/fish.htm> (April 18, 1996).
- ✓ Gronlund, N. E., & Linn, R. L. (1990). Measurement and Evaluation in Teaching (6th ed.). New York: Macmillan Publishing.
- ✓ Herman, J. L., Aschbacher, P. A., & Winters, L. (1992). A Practical Guide to Alternative Assessment. Alexandria, VA: Association for Supervision and Curriculum Development.
- ✓ Messick, S. (1994). Alternative Modes of Assessment, Uniform Standards of Validity (Report No. ETS-RR-94-60). Princeton, NJ: Educational Testing Service. (ERIC Document Reproduction Service No. ED 380 504)
- ✓ Sax, G. (1989). Principles of Educational and Psychological Measurement and Evaluation (3rd ed.). Belmont, CA: Wadsworth.

## **CAREER AND TECHNOLOGY STUDIES CURRICULUM DEVELOPMENT (Fisher, 1994)**

Curriculum development and its evolution over time is the direct result of formulated educational policy, identification of appropriate content and resources, and ultimately the implementation of the mandated knowledge, skills, and attitudes into the teaching-learning environments. Presumably all curriculum development is steeped in educational philosophy—a specialized derivative of general philosophy that attempts to answer the following basic questions: What is real? What is true? What is good? To pursue in-depth answers to these questions, however, would require a detailed study in such philosophic areas as ontology, epistemology, and axiology.

Needless to say, a somewhat more pragmatic approach to curriculum development is presented by identifying the philosophy, structure and parameters of the CTS program in Alberta.

### **The CTS Program Philosophy**

The Career and Technology Studies program in Alberta is a cross-discipline, levels-organized, competency-based, student-centered program that integrates business education, home economics, industrial education, and vocational education into 21 strands of content. This program is designed for students at both the junior and senior high school levels; content is packaged in approximately 25-hour modules organized at the introductory, intermediate and advanced levels; provides for flexible content access determined at the local school level; encourages innovative learning environments and a variety of content delivery strategies; emphasizes experiential learning opportunities involving independent study and group cooperative effort; identifies general and specific learner expectations and the conditions under which success should be demonstrated; and provides a personal use, career awareness or exploration, and preparation for entry-level employment or further post secondary education focus.

The key principles of the current business education program will continue to be emphasized. However, with the introduction of the CTS program, the focus will also include practical learning experiences, development of life skills and preparation for a career, simulated work and home environments, reinforcement of core subject content, integrated work experience education, and building individual confidence and self-esteem. Stated more specifically, all students who successfully complete one or more CTS modules will develop skills that they can apply in their daily lives now and in the future, refine career-planning skills, develop technology-related skills,

enhance employability skills, apply and reinforce learnings developed in other subject areas, develop personal management skills, and improve social interaction skills.

### **CTS Program Design**

The CTS curriculum program design is aimed at attaining student excellence. The key principles were designed to provide relevant and credible programs and include:

- Development of a single, integrated framework linking all Career and Technology Studies programs.
- Relevance of the programs ensured by improving linkages among educators, business/industry, the service sector, post secondary institutions, community agencies and Alberta Education throughout the design and validation of new curriculum.
- Basic and transferable knowledge, skills and attitudes integrated within each course.
- Student achievement and expected competencies defined in more specific terms. Standards which are credible with the community, the workplace and post secondary institutions will be more consistent across the province and more effectively communicated.
- Program articulation with further education programs, including post secondary institutions and apprenticeship programs will be strengthened. Strategies to promote ongoing program relevance will be pursued.
- The curriculum, structured into modules, will allow students, schools and school systems more flexibility in program planning and implementation. More flexible entry and exit points, based on demonstrated competencies, will be available.

### **CTS Program Initiatives**

Specifically stated, the CTS program mandate included:

- Greater emphasis on developing those basic and transferable skills which lead to a wide range of careers. Less emphasis on building skills for a specific trade or job.
- Emphasis on challenging students to achieve, motivating them through experiential learning in a context they find relevant.

- More clearly defined standards for student achievement.
- Improved articulation between junior high and senior high programs, and senior high and workplace expectations of workplace and post secondary institutions.
- More alternatives for program delivery, with increased access to CTS programs by all students in schools of varying sizes. Greater flexibility in timetabling and program planning particularly in those advanced level courses which focus on career preparation.
- More effective and efficient use of instructional learning time. Elimination of concepts and resources which are no longer relevant, which duplicate, or are redundant.
- More opportunity for students/teachers/schools to design programs which are relevant to individual and community needs and to integrate learnings from all areas of study.
- Improved support materials and cooperative professional development initiatives to assist teachers to meet individualized student needs. Classrooms, particularly in smaller centers, will be characterized by multiple programs and activities.
- Expanded linkages with learnings from core and other complementary courses.
- Increase integration of home economics, business education and industrial education programs to allow students to access modules that suit their individual needs and aspirations.

### **Program Developmental Considerations**

- Curriculum
  - scope and sequence
  - content
  - standards established for student achievement
  - learning resources
  - linkages with core/complementary
- School based program planning
  - selecting modules
  - timetabling
  - team teaching
- Facilities and equipment

- School-community partnerships
- Workplace/post secondary linkages
- Teachers role and professional expertise
- Grant structures
- Monitoring and reporting student progress

### **Curriculum Framework**

- Specific and general learner expectations defined within the concept of BASIC and CAREER - RELATED COMPETENCIES for each STRAND or AREA OF STUDY.
- Learner expectations (and learning and teaching resources) support experiential/process nature of the program.
- Wording of learner expectations communicate what competencies (a combination of the skills, knowledge and attitudes) students will develop and be able to demonstrate.
- Learner expectations organized into MODULES (based on a 25 - hour learning experience). - consistent structure to help planning
- Modules clearly specify entry - and exit - level competencies. (challenge)
- The modules are organized into levels related to the increased expectations for competencies -- student achievement based on increased rigor, complexity, and relationship to career goals:
  - Introductory levels -- daily living skills
  - Intermediate levels -- career awareness
  - Advance levels -- career-specific.
- Modules reinforce and expand
  - integrating concepts (careers, technology, self - management, enterprise and design, etc.)
  - related core and complementary skills, knowledge and attitudes.
- Where appropriate, modules specify parameters for:
  - equipment and facilities
  - instructional qualifications
  - alternative delivery strategies such as distance education and off - campus experiences.



- Learning Profiles will describe competencies developed in each module, strand, area of study and CTS program. Student's learning profiles will:
  - promote individualized instruction and student motivation
  - effectively communicate students' competencies to student, parents, business, and post secondary
  - base assessment upon standards that are clear, achievable and, where applicable, consistent with business and post secondary expectations
  - recognize and credit competencies developed outside of the formal school environment (hobbies, sports, private lessons, part-time employment, etc.)
  - Learning and teaching resources support effective "hands-on" learning for students:
    - of differing ability levels
    - with various learning styles
    - at differing stages in the career planning process
    - of varying interests and aptitudes.

### **Development Strategies**

A variety of development strategies are being used; such as,

- **IN-HOUSE DEVELOPMENT**  
Curriculum consultants draft the philosophy /rationale, scope and sequence, and content outline based on predevelopment reports, research of relevant literature and curriculum documents and personal expertise.
- **FOCUS GROUPS**  
Focus groups (8 members) bring together educators (2-3) and representatives of key interest groups (e.g., business/industry (1-2), post secondary (1-2), other government departments (1-2), community associations (1-2) for an intensive, short-term consultation on the area in which their expertise is needed. Focus groups respond/recommend the rationale, philosophy, scope and sequence and review draft programs of study and support documents and learning resources.
- **DEVELOPMENT TASK FORCES**  
A development task force is a group (5) of teacher specialists who draft general and specific learner expectations, review and screen

learning and teacher resources, and draft a teacher resource manual for a particular strand/area of study.

- **CONTRACTS WITH SCHOOL SYSTEMS**  
School systems have been contracted to prepare all or part of the program of studies, some or all of the support documents, and/or to identify learning and teaching resources. Alberta Education coordinates field validation and resource authorization.
- **CONTRACTS WITH INDIVIDUALS**  
Individuals have been contracted to prepare all or part of the program of studies, some or all of the support documents, and/or to identify learning and teaching resources. Alberta Education coordinates field validation and resource authorization.
- purchase/use of programs developed elsewhere, with rights to modify.

### **Validation Strategies**

As initial strand development reached interim completion status, the content and support resources of each strand was field reviewed for two consecutive years by teachers and students located in urban and rural areas, including large, medium and small schools in Alberta. This validation process included joint orientation and final debriefing meetings for all review teachers in addition to independently scheduled meetings, telephone conference calls, personal phone calls, faxes and regular mail. Feedback was also obtained through a provincial communication network of over three thousand interested teachers and other individuals who offered their suggestions and comments. Formally constituted Focus Group members representing business and industry, community and government organizations, secondary and post secondary stakeholders provided additional recommendations for each strand as well.

At the present time Assessment Panels have been established to help finalize and validate the expected module learner competencies and appropriate assessment tools. These groups will work closely with teachers in the field over the next two years before a final revision to each strand in the CTS curriculum is made in advance of the mandatory implementation of the program in the fall of 1997.

As this paper has identified, by reassessing, refocusing, and rejuvenating the traditional educational approach to schooling, it is possible to not only meet the evolving educational challenges present today, but also to provide a clear direction in which educational success can be achieved for tomorrow.

Educational curricula over a period of time is developed, implemented, revised, and reorganized in order to meet changing societal needs. Career and Technology Studies is designed to meet the emerging demands of an Alberta technological society

heading into the 21 century. Its ultimate success rests entirely in the hands of those dedicated educators who will develop, revise, and implement its directions and initiatives!

## Appendix B Glossary of Terms Used in Career and Technology Studies

(The terms and definitions provided in this glossary have been taken from various draft Alberta documents.)

<b><u>Term</u></b>	<b><u>Definition</u></b>
<b><i>ACC</i></b>	- Assessment Criteria and Conditions. ACC's are included for each module to provide guidelines for assessment of student achievement.
<b><i>Achievement Standards</i></b>	- describe how many students across the province will achieve a particular standard.
<b><i>Advanced Level Module</i></b>	- one of three levels of achievement defined in CTS. Advanced level modules demand a higher level of expertise and help prepare students for entry into the workplace or a related post-secondary program.
<b><i>Articulation</i></b>	- ensures smooth movement, without gaps or overlap, between one level to the next.
<b><i>Assessment Checklists</i></b>	- one type of assessment tool. Assessment Checklists are marking guides that describe, in detail, the processes/procedures/techniques/product a student must demonstrate. Checklist headings might be standard throughout the modules or the curriculum levels (introductory, intermediate, and advanced), and show increasing level of challenge in the specific descriptions.
<b><i>Assessment Standards</i></b>	- define how the student's performance will be judged. The four components of <i>criteria, conditions, tools, and weighting</i> are assessment standards.

### ***Assessment Tools***

- tools designed to assist teachers in assessing student work. Assessment tools are generally of two types: tools generic to a strand or to the entire CTS program. e.g.) standard 4-point *Competency Level scale* and tools specific to a module; e.g.) assessment checklists, competency scale, KSA's, and exemplars/reference sets.

### ***Basic Competencies***

- one of two types of competencies defined in the CTS program, the other one being *Career-Specific Competency*. Basic competencies, described in the *GLE*'s, will be integrated into each module. e.g.), personal management and social interaction

### ***Career-Specific Competencies***

- one of two types of competencies defined in the CTS program, the other one being *Basic Competency*. Career-Specific Competencies, described in the *MLE*'s and *SLE*'s, outline how students develop an understanding of:

- career/occupational/job opportunities that relate to the particular career area (*strand*)
- technologies and related processes that relate to a particular career area (*strand*)

### ***CEU***

- Credit Enrollment Unit

### ***Challenge Procedures***

- Junior high school students entering high school with previous courses in CTS may challenge the competencies in a module and upon successful demonstration of those competencies, may be granted advanced credit in a particular module.

<b><i>Competencies</i></b>	- Competencies outline what a student can <b>do</b> , and what a student <b>knows</b> . For instance, a student may make a <b>product</b> or demonstrate a <b>process</b> in order to show what they can <b>do</b> . Students link theory and practice to demonstrate what they <b>know</b> .
<b><i>Competency-Based Curriculum</i></b>	- see <i>Results-Based Curriculum</i>
<b><i>Competency Level Rating Scale</i></b>	- a standard 4-point assessment rating scale used in all CTS strands.
<b><i>Conditions</i></b>	- outline the specifications under which a student's competency can be judged. For example, the conditions could specify whether the assessment should be time or not, or if the student should be allowed to access to support resources or references.
<b><i>Conditions and Criteria</i></b>	- conditions and criteria set the framework for the assessment of student competency, specifying the <u>minimum standard</u> for performance and including a reference to <u>assessment tools</u> , where appropriate. (Located in the middle column of the Curriculum and Assessment Standards documents for modules.)
<b><i>Course</i></b>	- three or more modules linked into a course (1 credit = 1 module) according to parameters defined in the modules selected.
<b><i>Criteria</i></b>	- define the behaviors that a student must demonstrate to meet the designated standard. For example, the criteria could describe the various techniques that must be demonstrated when using a tool, and/or describe the minimum components of a project the student must complete.

<b><i>Cross-Discipline Program</i></b>	- CTS attempts to expand linkages with learnings from core and other complementary courses.
<b><i>CTS</i></b>	- Career and Technology Studies
<b><i>Curriculum Standards</i></b>	- describe what a student must know and be able to do in order to be successful in a particular module. Two of these standards include <i>program and module level</i> competencies.
<b><i>Entry-Level Competencies</i></b>	- competencies students have previously acquired which are pre-requisite to a particular module.
<b><i>Exemplars</i></b>	- selected examples of student work that help teachers decide if a student's work is at standard, above standard, or not yet at standard. Also called <i>Reference Sets</i> .
<b><i>Exemplar Projects</i></b>	- a type of assessment tool. Exemplar projects are sample projects for a module which exemplify the level of challenge and scope of application.
<b><i>Exemplar Questions</i></b>	- a type of assessment tool. Exemplar questions are sample questions for a module which exemplify the level of challenge and scope of learning.
<b><i>Exit-Level Competencies</i></b>	- <i>module learner expectations</i>
<b><i>Formative Assessment Standards</i></b>	- assessment throughout the learning period (or formative assessment) will continue to assess how students are progressing. Teachers direct and respond to students' efforts to learn - setting and marking assignments, sending out interim reports, congratulating excellence, etc.

<b>GLE</b>	- General Learner Expectations. These expectations describe the basic competencies that are integrated throughout the CTS program.
<b>GSI</b>	- Guide to Standards and Implementation
<b><i>Intermediate Level Module</i></b>	- one of three levels of achievement defined in CTS. Intermediate modules build on the competencies developed at the introductory level. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.
<b><i>Introductory Level Modules</i></b>	- one of three levels of achievement defined in CTS. Introductory level modules help students build daily living skills and form the basis for further learning. Introductory modules are developed for students who have no previous experience in the strand.
<b>KSA</b>	- Knowledge, Skills, and Attitudes or (KSA's) are integrated throughout the CTS Program. These are the most basic <i>competencies</i> in the CTS program. A student's performance and growth should be assessed through observations involving the student, the teacher, peers, and others. As the student progresses through the levels, he or she builds on competencies gained in earlier levels.
<b><i>Levels-Organized Program</i></b>	- The modules are organized into levels related to the increased expectations for competencies. The levels are introductory, intermediate, and advanced.



### ***Linkages/Transitions***

- There are both direct and indirect linkages among all CTS strands and with core courses. The competencies developed in strands, through the successful completion of individual modules, provide the student with a wide range of transitions into the workplace or related post-secondary programs.

### ***Module***

- the building blocks for each strand, based on a 25-hour learning experience. Modules define what a student is expected to know and be able to do. Modules outline required/elective *entry-level* and *exit-level* competencies.

### ***MLE***

- Module Learner Expectations define the exit-level competencies students are expected to achieve to complete a module. Each MLE defines and describes critical behaviors that can be measured and observed. The student must meet the standard specified for **ALL** MLE's within a module to be successful. (*MLE's will not change until 1997 when minor adjustments may be made to update and clarify wording.*) (Located in the shaded left column of the Curriculum and Assessment Standards documents for modules.)

### ***Reference Sets***

- selected examples of student work that help teachers decide if a student's work is at standard, above standard, or not yet standard. Also called *Exemplars*.

### ***Results-Based Curriculum***

- The CTS curriculum supports the key principles of results-based curriculum through the following: how the curriculum is structured; the type and range of learning, teaching, and support resources being identified; expanded delivery opportunities at the classroom, school, and system level.

<b><i>SLE</i></b>	- Specific Learner Expectations. SLE's outline where to start and where to stop. <i>MLE</i> 's are a culmination of the SLE's, which provide a more detailed framework for instruction.
<b><i>SLG</i></b>	- Student Learning Guide. An SLG provides an instructional plan for selected modules and is designed for individual student or small group use.
<b><i>Standard</i></b>	- The <i>standard</i> may be defined by: (1) assessment tools, and/or exemplars of student work (to be developed and distributed as "Reference Sets" in June 1997.)
<b><i>Student Centered Program</i></b>	- the curriculum, structured into modules allows for students flexibility in choosing their own module, based upon their interests, abilities, and career aspirations. Students work with a SLG and may proceed through the module individually.
<b><i>Strand</i></b>	- groups of modules that have related knowledge, skills, and attitudes within an occupational/career area.
<b><i>Successful Completion</i></b>	- when a student can demonstrate ALL of the exit-level competencies defined for the module ( <i>MLE</i> 's), the teacher will designate the module as "successfully completed." The teacher will then use accepted grading practices to determine the percentage grade to be given for the module - a mark not less than 50%.
<b><i>Suggested Emphasis</i></b>	- provides a guideline for the relative significance of each <i>MLE</i> and can be used to organize for instruction. (Located in the right column of the Curriculum and Assessment Standards documents for modules.)

***Summative Assessment Standards***

- summative assessment standards focus on the final assessment of student achievement.

***Tools***

- the details/working materials that support the assessment of the product, process, and theory.

***Tracking***

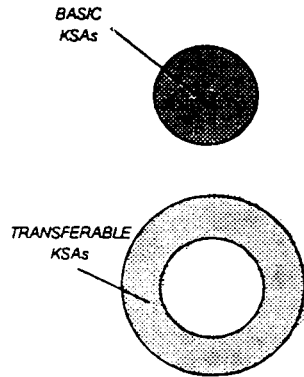
- Tracking is keeping a record of what modules students have completed. This type of record keeping goes on at the school/system level.

***Weighting***

- a guidelines to help teachers establish student grades (%).

## CURRICULUM STRUCTURE (Alberta Education, 1992, p. 4)

*Curriculum* will be developed in modules.



**MODULES:** Modules define knowledge, skills and attitudes (KSAs) as entry/exit competencies.

**Basic Competencies** (integrated into all modules)

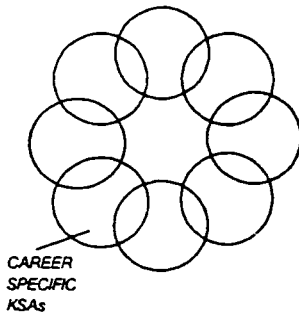
- Self-management (desirable personal characteristics, thinking and learning skills, design, innovation, initiative, resource [time, materials] management)
- Social (dealing with others, responsibilities, negotiating, accountability, safety, leadership)
- Academic (using words, numbers, technology, scientific principles, previous learning)

**Transferable Competencies** (relevant across strands or areas of study)

**Career-related Competencies** (support post-secondary and/or workplace transitions)

Modules will specify prerequisites and facility and instructional parameters where necessary.

*Schools* will organize modules into courses.



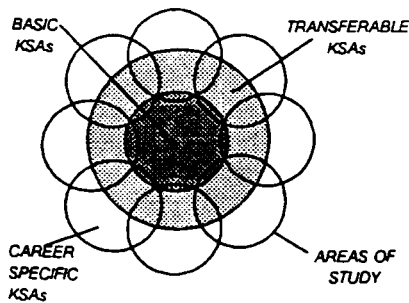
**STRANDS:** Groups of modules that have related knowledge, skills and attitudes within an occupational/career area.

**AREAS OF STUDY:** Strands that are related through similar:

- basic and transferable skills, knowledge and attitudes, and/or
- working environments and situations, and/or
- clientele, and/or
- products.

Courses will be organized according to prerequisites and parameters defined for each module.

*Students* will have greater opportunity to develop competencies they find relevant.



**INTEGRATED CURRICULUM FRAMEWORK:** Allows students to:

- explore and assess a wider range of careers
- recognize how the competencies they develop:
  - transfer to many situations
  - support a wide range of career opportunities
- experience success in a variety of learning environments (cognitive, social, experiential)
- progress at a rate that is personally challenging
- learn in a context they find relevant
- make a smooth transition to the workplace or a post-secondary program
- apply and expand core competencies.

(Alberta Education, 1996b)

**IMPLEMENTATION SCHEDULE CAREER AND TECHNOLOGY STUDIES  
AS OF JUNE 1996**

YEAR STRAND	1992-93	1993-94	1994-95	1995-96	1996-97	
Agriculture			★		●	
Career Transitions			★		●	
Communication Technology			★ ●			
Community Health					★ ●	
Construction Technologies			★		●	
Cosmetology Studies				★	●	
Design Studies			★	●		
Electro-Technologies					★ ●	
Energy and Mines				★	●	
Enterprise and Innovation	★ ●					
Fabrication Studies				★	●	
Fashion Studies				★	●	
Financial Management			★ ●			
Foods			★ ●			
Forestry			★		●	
Information Processing			★ ●			
Legal Studies			★	●		
Logistics					★ ●	
Management and Marketing				★	●	
Mechanics				★	●	
Tourism Studies		★ ●				
Wildlife			★		●	

■ Provincial Implementation    ★ Programs scheduled to be available on optional basis  
● Selected modules available in French.

CSB: CTS Implementation Schedule (96 07 09)

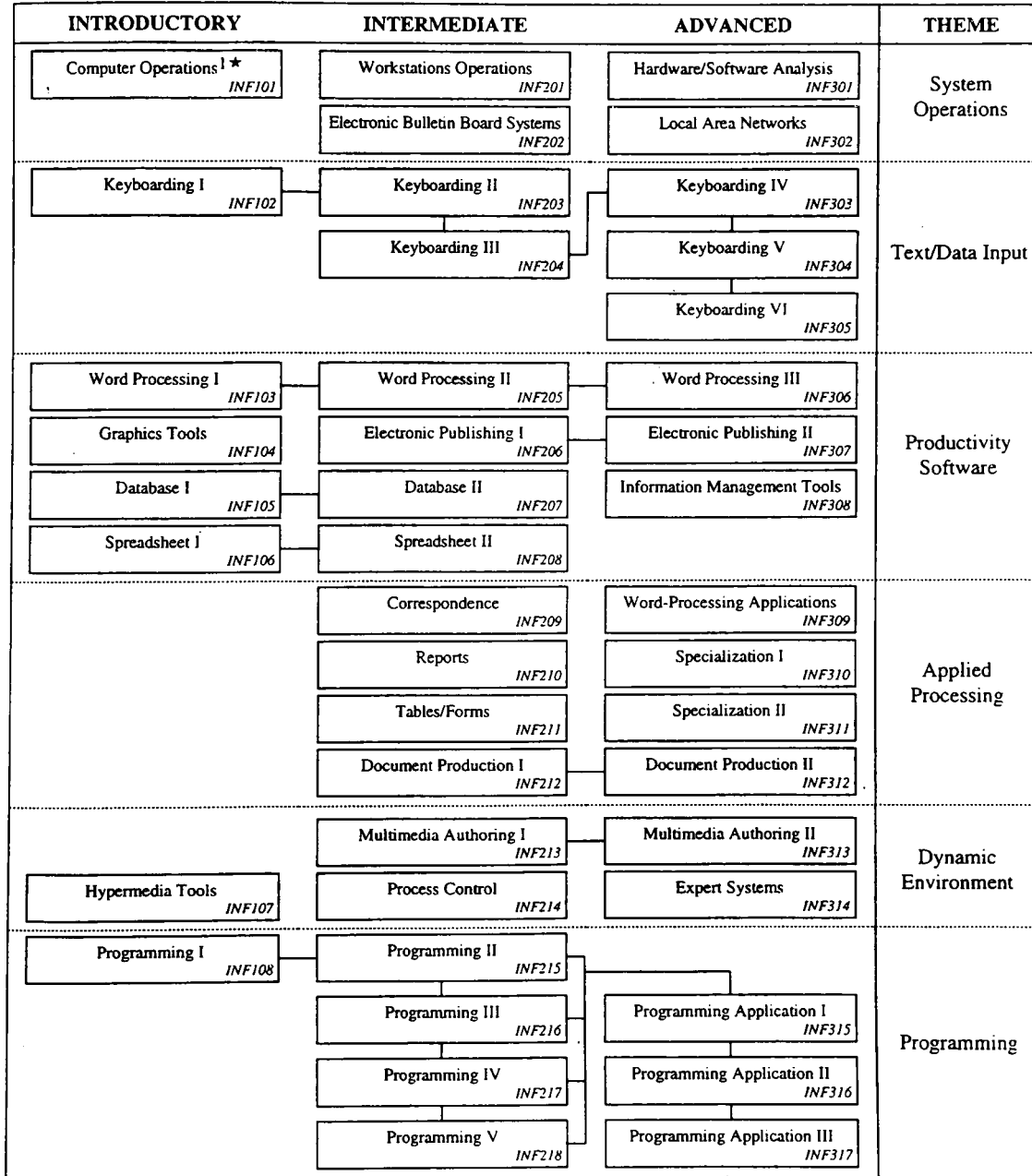
(Alberta Education, 1994a, p. B.5)

(Interim Status, 1994)

SCOPE AND SEQUENCE

INFORMATION PROCESSING

Appendix E  
Scope and Sequence Chart for Information Processing



— Prerequisite      - - - - - Recommended sequence

I. Prerequisite to all modules in this strand.

\* This module provides a strong foundation for further learning in this strand.

Appendix F Alberta Education's Proposed Checklist: Spreadsheets

**ASSESSMENT CHECKLIST: SPREADSHEETS** INFSS

STUDENT: \_\_\_\_\_

MODULE: INF \_\_\_\_\_

STANDARD Students working at standard must demonstrate problem solving techniques through the use of software functions noted in the checklists below and in the preparation of well designed and accurate documents. The columns to the left of the checklists indicate the minimum competency level for at standard performance for the introductory and intermediate level modules. The scale at the bottom defines the different levels of competencies. Note: the list of software functions indicated by an asterisk [\*] may need to be adjusted to reflect software that is available.

At Standard	Introductory Level (INF106)	At Standard	Intermediate Level (INF208)
1	<b>Solving Problems with Spreadsheets</b> <input type="checkbox"/> define problems <input type="checkbox"/> plan, design and create spreadsheets to solve problems and make decisions <input type="checkbox"/> present data visually through appropriate selection and use of chart graphing <input type="checkbox"/> analyze data to draw conclusions and make recommendations <input type="checkbox"/> cite references where appropriate	2	<b>Solving Problems with Spreadsheets</b> <input type="checkbox"/> define problems <input type="checkbox"/> plan, design and create spreadsheets to solve problems and make decisions <input type="checkbox"/> present data visually through appropriate selection and use of chart graphing <input type="checkbox"/> analyze data to draw conclusions and make recommendations <input type="checkbox"/> cite references where appropriate
1	<b>Formatting Functions -</b> <input type="checkbox"/> enter text: headings / labels <input type="checkbox"/> enter values: numbers, *dates, * time <input type="checkbox"/> align cells: left, right, centre <input type="checkbox"/> use text styles: bold, underline, italics, borders, shading <input type="checkbox"/> use font styles / sizes <input type="checkbox"/> format numbers: %, \$, commas, decimals <input type="checkbox"/> enter formulas using - operators (e.g. +, -, x, /) -- numbers, constant values (i.e. 1, 10, 12.5, -16)	2	<b>Formatting Functions - continue to demonstrate use of basic software functions at intro level plus</b> <input type="checkbox"/> enter a series of numbers or dates <input type="checkbox"/> show / hide formulas <input type="checkbox"/> calculate / recalculate "what if" scenarios <input type="checkbox"/> hide columns <input type="checkbox"/> incorporate macros <input type="checkbox"/> use template function <input type="checkbox"/> merge with another document
1	<b>Proofread / Edit Functions -</b> <input type="checkbox"/> create new files (save as) <input type="checkbox"/> open/close/update files (save) <input type="checkbox"/> move around spreadsheet (cursors, go to, select, home, end, page up / down, *scroll bar / arrows) <input type="checkbox"/> change appearance: - cell height / width / alignment - add / delete borders and shading	2	<b>Proofread / Edit Functions - continue to demonstrate use of basic software functions at intro level plus:</b> <input type="checkbox"/> insert / delete manual page breaks <input type="checkbox"/> change headers / footers / page numbering
1	<b>Chart Formatting Functions -</b> <input type="checkbox"/> convert spreadsheet to chart graphs (bar, line, pie, XY, combination) <input type="checkbox"/> name charts / update / open / rename <input type="checkbox"/> create / edit charts - add and delete axes - change scale of axes - add or remove right vertical axis - add or change category labels	2	<b>Chart Formatting Functions - continue to demonstrate use of basic software functions at intro level plus</b> <input type="checkbox"/> change marker shapes in line graphs <input type="checkbox"/> explode a pie chart <input type="checkbox"/> mix lines and bars in a graph <input type="checkbox"/> duplicate a chart <input type="checkbox"/> merge with another document

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Competency Level	4. <u>Consistently</u> demonstrates all of the designated techniques efficiently without prompting.	3. <u>Usually</u> demonstrates all of the designated techniques efficiently, <u>seldom</u> needs prompting.	2. <u>Generally</u> demonstrates <u>most</u> of the designated techniques, seldom needs prompting.	1. Can demonstrate designated techniques, but occasionally needs prompting	0. Cannot demonstrate designated techniques
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Appendix G Alberta Education's Proposed Checklist: Databases

**ASSESSMENT CHECKLIST: DATABASES** **INFDB**

STUDENT: \_\_\_\_\_

MODULE: INF \_\_\_\_\_

**STANDARD** Students working at **standard** must demonstrate problem solving techniques through the use of software functions noted in the checklists below and in the preparation of well designed and accurate records and reports. The columns to the left of the checklists indicate the minimum competency level for at **standard** performance for the introductory and intermediate level modules. The scale at the bottom defines the different levels of competencies. Note: the list of software functions indicated by an asterisk (\*) may need to be adjusted to reflect software that is available.

At Standard	<i>Introductory Level (INF105)</i>	At Standard	<i>Intermediate Level (INF207)</i>	
1	<p><b>Solving Problems with Databases</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> define problem</li> <li><input type="checkbox"/> plan, design and create databases to solve problems and make decisions</li> <li><input type="checkbox"/> present data visually through the creation of reports</li> <li><input type="checkbox"/> analyze data to draw conclusions and make recommendations</li> <li><input type="checkbox"/> cites references where appropriate</li> </ul>	2	<p><b>Solving Problems with Databases</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> define problem</li> <li><input type="checkbox"/> plan, design and create databases to solve problems and make decisions</li> <li><input type="checkbox"/> present data visually through the creation of reports</li> <li><input type="checkbox"/> analyze data to draw conclusions and make recommendations</li> <li><input type="checkbox"/> cites references where appropriate</li> </ul>	
1	<p><b>Format Records / Forms:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> create fields and records using form / list view</li> <li><input type="checkbox"/> specify size of fields</li> <li><input type="checkbox"/> enter information into fields                             <ul style="list-style-type: none"> <li>- labels (text)</li> <li>- numbers, dates, time</li> <li>- formulas</li> </ul> </li> <li><input type="checkbox"/> create calculated field</li> <li><input type="checkbox"/> use tab to move around a record</li> <li><input type="checkbox"/> work with multiple records in different views</li> <li><input type="checkbox"/> align fields: left, right, centre</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> text styles: bold, underscore, italics,</li> <li><input type="checkbox"/> font types / sizes</li> <li><input type="checkbox"/> format numbers: %, \$, commas, decimals</li> <li><input type="checkbox"/> highlight fields / forms / cells</li> <li><input type="checkbox"/> page and margin settings</li> <li><input type="checkbox"/> footers/headers/page numbering</li> <li><input type="checkbox"/> help function</li> <li><input type="checkbox"/> preview / print records in form and list view</li> <li><input type="checkbox"/> preview / print records in portrait and landscape</li> </ul>	2	<p><b>Format Records / Forms:</b> continue use of all software functions in introductory level plus</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> view several part of database at same time in list view</li> <li><input type="checkbox"/> insert/move/remove a split</li> <li><input type="checkbox"/> page break in form and list view</li> <li><input type="checkbox"/> protect a database: unlock and lock fields / form design</li> <li><input type="checkbox"/> use template function</li> <li><input type="checkbox"/> merge and or link with 2 or more databases</li> </ul>
1	<p><b>Proofread / Edit / Search</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> move around database (cursors, go to, select, home, end, page up / down, *scroll bar / arrows)</li> <li><input type="checkbox"/> create / update / recall / rename files</li> <li><input type="checkbox"/> locate specific records in a file</li> <li><input type="checkbox"/> modify records: insert / delete / adjust                             <ul style="list-style-type: none"> <li>- fields (e.g. name, size)</li> <li>- field entries (text, numbers, dates)</li> <li>- font types / sizes</li> <li>- text styles and field alignments</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> copy / move / paste within a database</li> <li><input type="checkbox"/> sort alphabetically, numerically and chronologically</li> <li><input type="checkbox"/> search a database to find                             <ul style="list-style-type: none"> <li>- selected records that match</li> <li>- selected records that are above or below values</li> <li>- selected records with a specific alphabetic or numeric range</li> </ul> </li> </ul>	2	<p><b>Proofread / Edit/Search</b>-continue use of all software functions in intro level plus</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> insert / delete manual page breaks</li> <li><input type="checkbox"/> change headers / footers / page numbers</li> <li><input type="checkbox"/> search databases to find                             <ul style="list-style-type: none"> <li>- selected records that meet several conditions (and/or)</li> <li>- selected records that do not match a specific condition</li> <li>- use mathematical operators/functions to query</li> <li>- use wildcards in a query</li> <li>- use dates in a query</li> </ul> </li> </ul>
1	<p><b>Format Reports</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> title reports</li> <li><input type="checkbox"/> select fields for a report</li> <li><input type="checkbox"/> calculate statistics in rows, columns, for entire report</li> <li><input type="checkbox"/> sort reports in alphabetic, numeric, and chronological order</li> <li><input type="checkbox"/> search for selected records for a report</li> <li><input type="checkbox"/> modify reports: add / delete / adjust</li> </ul>	<ul style="list-style-type: none"> <li>- fields and records</li> <li>- titles, headings,</li> <li>- text, numbers, dates</li> <li>- column width</li> <li>- font types and sizes, text and numbers (\$,% ,)</li> <li>- text styles and field alignments</li> <li><input type="checkbox"/> save / delete / preview / print reports</li> </ul>	2	<p><b>Format Reports</b> - continue use of all software functions at the introductory level plus</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> create and use macros</li> <li><input type="checkbox"/> merge databases with other documents</li> <li><input type="checkbox"/></li> </ul>

<b>Competency Level</b>	4. <u>Consistently</u> demonstrates <u>all</u> of the designated techniques efficiently without prompting.	3. <u>Usually</u> demonstrates <u>all</u> of the designated techniques efficiently, <u>seldom</u> needs prompting.	2. <u>Generally</u> demonstrates <u>most</u> of the designated techniques, <u>seldom</u> needs prompting.	1. Can demonstrate designated techniques, but occasionally needs prompting	0. Cannot demonstrate designated techniques
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Appendix H Revised Checklist: Spreadsheets (Introductory)

ASSESSMENT CHECKLIST: SPREADSHEETS (SS)

Introductory Level (INF106)

INFSS-106

STUDENT: \_\_\_\_\_

DATE: \_\_\_\_\_

**Instructions**  
 Apply the rating scale to each item on this checklist. If the particular technique has not been demonstrated by the student, assign zero. If the particular technique has been demonstrated by the student, assign the number on the rating scale that corresponds with the amount of prompting the student required to complete the technique.  
 Students must demonstrate the techniques through the use of software functions noted in the checklists below and in the preparation of well designed and accurate documents. Note: Those techniques indicated by an asterisk (\*) may need to be adjusted to reflect software and hardware that is available.

Rating Scale	0) Cannot demonstrate the designated technique.	1) Can demonstrate the designated technique, but frequently needs prompting.	2) Can demonstrate the designated technique, occasionally needs prompting.	3) Can demonstrate the designated technique, rarely needs prompting.	4) Can demonstrate the designated technique efficiently, without prompting.
--------------	---	--	--	--	---

<b>SECTION A</b>	<b>File Management</b>	<b>Formatting Techniques</b>	<input type="checkbox"/> enter values - *time	<input type="checkbox"/> use pagination	<input type="checkbox"/> format commas	<input type="checkbox"/> formula using division	<input type="checkbox"/> use *freeze frame
	<input type="checkbox"/> create new file	<input type="checkbox"/> use help function	<input type="checkbox"/> use copy down	<input type="checkbox"/> turn on gridlines	<input type="checkbox"/> format decimals	<input type="checkbox"/> formula using multiplication	<input type="checkbox"/> show formula
	<input type="checkbox"/> save new file (save as)	<input type="checkbox"/> highlight cells	<input type="checkbox"/> use copy right	<input type="checkbox"/> turn off gridlines	<input type="checkbox"/> use different font size	<input type="checkbox"/> formula with cell references	<input type="checkbox"/> hide formula
	<input type="checkbox"/> open file	<input type="checkbox"/> highlight columns	<input type="checkbox"/> use bold	<input type="checkbox"/> align cells - center	<input type="checkbox"/> use different font style	<input type="checkbox"/> formula with range references	<input type="checkbox"/> preview - portrait
	<input type="checkbox"/> close file	<input type="checkbox"/> highlight rows	<input type="checkbox"/> use underscore	<input type="checkbox"/> align cells - left		<input type="checkbox"/> use sum function	<input type="checkbox"/> print - portrait
		<input type="checkbox"/> highlight a range	<input type="checkbox"/> use italics	<input type="checkbox"/> align cells - right		<input type="checkbox"/> use min/max function	<input type="checkbox"/> preview - *landscape
		<input type="checkbox"/> enter text - heading	<input type="checkbox"/> use borders	<input type="checkbox"/> create a header		<input type="checkbox"/> use average function	<input type="checkbox"/> print - *landscape
		<input type="checkbox"/> enter text - labels	<input type="checkbox"/> use shading	<input type="checkbox"/> create a footer	<b>Working With Formulas</b>	<input type="checkbox"/> formula using numbers	
		<input type="checkbox"/> enter values - numbers	<input type="checkbox"/> use fill down	<input type="checkbox"/> format percentages	<input type="checkbox"/> formula using addition	<input type="checkbox"/> formula using constant values	
		<input type="checkbox"/> enter values - *date	<input type="checkbox"/> use fill right	<input type="checkbox"/> format currency amounts	<input type="checkbox"/> formula using subtraction	<input type="checkbox"/> use *split frame	

<b>SECTION B</b>	<b>Working With *Keys/Mouse</b>	<b>Editing Techniques</b>	<input type="checkbox"/> add shading	<input type="checkbox"/> change right margin	<input type="checkbox"/> copy cell	<input type="checkbox"/> move cell group
	<input type="checkbox"/> use end key	<input type="checkbox"/> change cell width	<input type="checkbox"/> delete shading	<input type="checkbox"/> change left margin	<input type="checkbox"/> move cell	<input type="checkbox"/> paste cell group
	<input type="checkbox"/> use page up key	<input type="checkbox"/> change cell *height	<input type="checkbox"/> setup page - portrait	<input type="checkbox"/> insert rows	<input type="checkbox"/> paste cell	<input type="checkbox"/> sort numerically
	<input type="checkbox"/> move cursor	<input type="checkbox"/> change cell alignment	<input type="checkbox"/> setup page - *landscape	<input type="checkbox"/> delete rows	<input type="checkbox"/> edit cell	<input type="checkbox"/> sort alphabetically
	<input type="checkbox"/> use *go to key	<input type="checkbox"/> add borders	<input type="checkbox"/> change top margin	<input type="checkbox"/> insert columns	<input type="checkbox"/> edit cell group	
	<input type="checkbox"/> use *select key	<input type="checkbox"/> delete borders	<input type="checkbox"/> change bottom margin	<input type="checkbox"/> delete columns	<input type="checkbox"/> copy cell group	
	<input type="checkbox"/> use home key					

<b>SECTION C</b>	<b>Chart Management</b>	<b>Chart Formatting Techniques</b>	<input type="checkbox"/> convert SS to XY chart	<input type="checkbox"/> add category label	<input type="checkbox"/> change legend	<input type="checkbox"/> delete a subtitle
	<input type="checkbox"/> create chart	<input type="checkbox"/> convert SS to combination chart	<input type="checkbox"/> convert SS to combination chart	<input type="checkbox"/> change category label	<input type="checkbox"/> delete legend	<input type="checkbox"/> delete a chart
	<input type="checkbox"/> name chart	<input type="checkbox"/> add axes	<input type="checkbox"/> add axes	<input type="checkbox"/> add data labels	<input type="checkbox"/> add a title	<input type="checkbox"/> preview chart
	<input type="checkbox"/> open chart	<input type="checkbox"/> delete axes	<input type="checkbox"/> change scale of axes	<input type="checkbox"/> delete data labels	<input type="checkbox"/> change a title	<input type="checkbox"/> print chart
	<input type="checkbox"/> update chart	<input type="checkbox"/> change scale of axes	<input type="checkbox"/> add right vertical axes	<input type="checkbox"/> change colors	<input type="checkbox"/> delete a title	
	<input type="checkbox"/> rename chart	<input type="checkbox"/> convert SS to bar chart	<input type="checkbox"/> add vertical axes	<input type="checkbox"/> change patterns	<input type="checkbox"/> add a subtitle	
		<input type="checkbox"/> convert SS to line chart	<input type="checkbox"/> delete vertical axes	<input type="checkbox"/> add a legend	<input type="checkbox"/> change a subtitle	
		<input type="checkbox"/> convert SS to pie chart				

**Overall Averages**      **SECTION A** \_\_\_\_\_      **SECTION B** \_\_\_\_\_      **SECTION C** \_\_\_\_\_      **MODULE GRADE** \_\_\_\_\_

Appendix I Revised Checklist: Spreadsheets (Intermediate)

**ASSESSMENT CHECKLIST: SPREADSHEETS (SS)** **Intermediate Level (INF208)** **INFSS-208**

STUDENT: \_\_\_\_\_

DATE: \_\_\_\_\_

<b>Instructions</b>	Apply the rating scale to each item on this checklist. If the particular technique has not been demonstrated by the student, assign zero. If the particular technique has been demonstrated by the student, assign the number on the rating scale that corresponds with the amount of prompting the student required to complete the technique. Students must demonstrate the techniques through the use of software functions noted in the checklists below and in the preparation of well designed and accurate documents. Note: Those techniques indicated by an asterisk (*) may need to be adjusted to reflect software and hardware that is available.
---------------------	---

Rating Scale	0) Cannot demonstrate the designated technique.	1) Can demonstrate the designated technique, but frequently needs prompting.	2) Can demonstrate the designated technique, occasionally needs prompting.	3) Can demonstrate the designated technique, rarely needs prompting.	4) Can demonstrate the designated technique efficiently, without prompting.
--------------	---	--	--	--	---

<b>SECTION A</b>	<b>Formatting Techniques</b>				
<b>File Management</b>	<input type="checkbox"/> use help function	<input type="checkbox"/> use copy down	<input type="checkbox"/> use pagination	<input type="checkbox"/> format commas	<input type="checkbox"/> formula using division
<input type="checkbox"/> create new file	<input type="checkbox"/> highlight cells	<input type="checkbox"/> use copy right	<input type="checkbox"/> turn on gridlines	<input type="checkbox"/> format decimals	<input type="checkbox"/> use *freeze frame
<input type="checkbox"/> save new file (save as)	<input type="checkbox"/> highlight columns	<input type="checkbox"/> use bold	<input type="checkbox"/> turn off gridlines	<input type="checkbox"/> use different font size	<input type="checkbox"/> formula using multiplication
<input type="checkbox"/> open file	<input type="checkbox"/> highlight rows	<input type="checkbox"/> use underscore	<input type="checkbox"/> align cells - center	<input type="checkbox"/> use different font style	<input type="checkbox"/> formula with cell references
<input type="checkbox"/> close file	<input type="checkbox"/> highlight a range	<input type="checkbox"/> use italics	<input type="checkbox"/> align cells - left	<input type="checkbox"/> enter a series of numbers	<input type="checkbox"/> formula with range references
<input type="checkbox"/> use template function	<input type="checkbox"/> enter text - heading	<input type="checkbox"/> use borders	<input type="checkbox"/> align cells - right	<input type="checkbox"/> enter a series of dates	<input type="checkbox"/> use sum function
<input type="checkbox"/> incorporate a macro	<input type="checkbox"/> enter text - labels	<input type="checkbox"/> use shading	<input type="checkbox"/> create a header	<input type="checkbox"/> use min/max function	<input type="checkbox"/> use average function
<input type="checkbox"/> merge documents	<input type="checkbox"/> enter values - numbers	<input type="checkbox"/> use fill down	<input type="checkbox"/> create a footer	<input type="checkbox"/> formula using numbers	<input type="checkbox"/> hide column
	<input type="checkbox"/> enter values - *date	<input type="checkbox"/> use fill right	<input type="checkbox"/> format percentages	<input type="checkbox"/> formula using addition	<input type="checkbox"/> formula using constant values
		<input type="checkbox"/> use fill right	<input type="checkbox"/> format currency amounts	<input type="checkbox"/> formula using subtraction	<input type="checkbox"/> use *split frame
					<input type="checkbox"/> calculate "what if"

<b>SECTION B</b>	<b>Editing Techniques</b>				
<b>Working With *Keys/Mouse</b>	<input type="checkbox"/> use end key	<input type="checkbox"/> change cell width	<input type="checkbox"/> add shading	<input type="checkbox"/> change right margin	<input type="checkbox"/> copy cell
<input type="checkbox"/> move cursor	<input type="checkbox"/> use page up key	<input type="checkbox"/> change cell *height	<input type="checkbox"/> delete shading	<input type="checkbox"/> change left margin	<input type="checkbox"/> move cell group
<input type="checkbox"/> use *go to key	<input type="checkbox"/> use page down key	<input type="checkbox"/> change cell alignment	<input type="checkbox"/> setup page - portrait	<input type="checkbox"/> insert rows	<input type="checkbox"/> paste cell group
<input type="checkbox"/> use *select key	<input type="checkbox"/> use *scroll bar	<input type="checkbox"/> change cell alignment	<input type="checkbox"/> setup page - *landscape	<input type="checkbox"/> delete rows	<input type="checkbox"/> paste cell
<input type="checkbox"/> use home key	<input type="checkbox"/> use arrow keys	<input type="checkbox"/> add borders	<input type="checkbox"/> change top margin	<input type="checkbox"/> insert columns	<input type="checkbox"/> edit cell
		<input type="checkbox"/> delete borders	<input type="checkbox"/> change bottom margin	<input type="checkbox"/> delete columns	<input type="checkbox"/> edit cell group
					<input type="checkbox"/> copy cell group
					<input type="checkbox"/> insert manual page break
					<input type="checkbox"/> delete manual page break

<b>SECTION C</b>	<b>Chart Management</b>				
<b>Chart Management</b>	<input type="checkbox"/> duplicate a chart	<input type="checkbox"/> convert SS to XY chart	<input type="checkbox"/> add category label	<input type="checkbox"/> change legend	<input type="checkbox"/> delete a subtitle
<input type="checkbox"/> create chart	<input type="checkbox"/> merge documents	<input type="checkbox"/> convert SS to combination chart	<input type="checkbox"/> change category label	<input type="checkbox"/> delete legend	<input type="checkbox"/> delete a chart
<input type="checkbox"/> name chart		<input type="checkbox"/> add axes	<input type="checkbox"/> add data labels	<input type="checkbox"/> add a title	<input type="checkbox"/> preview chart
<input type="checkbox"/> open chart	<b>Chart Formatting Techniques</b>	<input type="checkbox"/> delete axes	<input type="checkbox"/> delete data labels	<input type="checkbox"/> change a title	<input type="checkbox"/> print chart
<input type="checkbox"/> update chart	<input type="checkbox"/> convert SS to bar chart	<input type="checkbox"/> change scale of axes	<input type="checkbox"/> change colors	<input type="checkbox"/> delete a title	<input type="checkbox"/> mix lines and bars in a graph
<input type="checkbox"/> rename chart	<input type="checkbox"/> convert SS to line chart	<input type="checkbox"/> add right vertical axes	<input type="checkbox"/> change patterns	<input type="checkbox"/> add a subtitle	<input type="checkbox"/> change marker shapes in line graphs
	<input type="checkbox"/> convert SS to pie chart	<input type="checkbox"/> delete vertical axes	<input type="checkbox"/> add a legend	<input type="checkbox"/> change a subtitle	<input type="checkbox"/> explode a pie chart

**Overall Averages**    **SECTION A** \_\_\_\_\_    **SECTION B** \_\_\_\_\_    **SECTION C** \_\_\_\_\_    **MODULE GRADE** \_\_\_\_\_

Appendix G Alberta Education's Proposed Checklist: Databases

**ASSESSMENT CHECKLIST: DATABASES** **INFDB**

STUDENT: \_\_\_\_\_

MODULE: INF \_\_\_\_\_

**STANDARD** Students working at **standard** must demonstrate problem solving techniques through the use of software functions noted in the checklists below and in the preparation of well designed and accurate records and reports. The columns to the left of the checklists indicate the minimum competency level for at **standard** performance for the introductory and intermediate level modules. The scale at the bottom defines the different levels of competencies. Note: the list of software functions indicated by an asterisk (\*) may need to be adjusted to reflect software that is available.

At Standard	<i>Introductory Level (INF105)</i>	At Standard	<i>Intermediate Level (INF207)</i>	
1	<p><b>Solving Problems with Databases</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> define problem</li> <li><input type="checkbox"/> plan, design and create databases to solve problems and make decisions</li> <li><input type="checkbox"/> present data visually through the creation of reports</li> <li><input type="checkbox"/> analyze data to draw conclusions and make recommendations</li> <li><input type="checkbox"/> cites references where appropriate</li> </ul>	2	<p><b>Solving Problems with Databases</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> define problem</li> <li><input type="checkbox"/> plan, design and create databases to solve problems and make decisions</li> <li><input type="checkbox"/> present data visually through the creation of reports</li> <li><input type="checkbox"/> analyze data to draw conclusions and make recommendations</li> <li><input type="checkbox"/> cites references where appropriate</li> </ul>	
1	<p><b>Format Records / Forms:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> create fields and records using form / list view</li> <li><input type="checkbox"/> specify size of fields</li> <li><input type="checkbox"/> enter information into fields                             <ul style="list-style-type: none"> <li>- labels (text)</li> <li>- numbers, dates, time</li> <li>- formulas</li> </ul> </li> <li><input type="checkbox"/> create calculated field</li> <li><input type="checkbox"/> use tab to move around a record</li> <li><input type="checkbox"/> work with multiple records in different views</li> <li><input type="checkbox"/> align fields: left, right, centre</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> text styles: bold, underscore, italics,</li> <li><input type="checkbox"/> font types / sizes</li> <li><input type="checkbox"/> format numbers: %, \$, commas, decimals</li> <li><input type="checkbox"/> highlight fields / forms / cells</li> <li><input type="checkbox"/> page and margin settings</li> <li><input type="checkbox"/> footers/headers/page numbering</li> <li><input type="checkbox"/> help function</li> <li><input type="checkbox"/> preview / print records in form and list view</li> <li><input type="checkbox"/> preview / print records in portrait and landscape</li> </ul>	2	<p><b>Format Records / Forms:</b> continue use of all software functions in introductory level plus</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> view several part of database at same time in list view</li> <li><input type="checkbox"/> insert/move/remove a split</li> <li><input type="checkbox"/> page break in form and list view</li> <li><input type="checkbox"/> protect a database: unlock and lock fields / form design</li> <li><input type="checkbox"/> use template function</li> <li><input type="checkbox"/> merge and or link with 2 or more databases</li> </ul>
1	<p><b>Proofread / Edit / Search</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> move around database (cursors, go to, select, home, end, page up / down, *scroll bar / arrows)</li> <li><input type="checkbox"/> create / update / recall / rename files</li> <li><input type="checkbox"/> locate specific records in a file</li> <li><input type="checkbox"/> modify records: insert / delete / adjust                             <ul style="list-style-type: none"> <li>- fields (e.g. name, size)</li> <li>- field entries (text, numbers, dates)</li> <li>- font types / sizes</li> <li>- text styles and field alignments</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> copy / move / paste within a database</li> <li><input type="checkbox"/> sort alphabetically, numerically and chronologically</li> <li><input type="checkbox"/> search a database to find                             <ul style="list-style-type: none"> <li>- selected records that match</li> <li>- selected records that are above or below values</li> <li>- selected records with a specific alphabetic or numeric range</li> </ul> </li> </ul>	2	<p><b>Proofread / Edit/Search</b>-continue use of all software functions in intro level plus</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> insert / delete manual page breaks</li> <li><input type="checkbox"/> change headers / footers / page numbers</li> <li><input type="checkbox"/> search databases to find                             <ul style="list-style-type: none"> <li>- selected records that meet several conditions (and/or)</li> <li>- selected records that do not match a specific condition</li> <li>- use mathematical operators/functions to query</li> <li>- use wildcards in a query</li> <li>- use dates in a query</li> </ul> </li> </ul>
1	<p><b>Format Reports</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> title reports</li> <li><input type="checkbox"/> select fields for a report</li> <li><input type="checkbox"/> calculate statistics in rows, columns, for entire report</li> <li><input type="checkbox"/> sort reports in alphabetic, numeric, and chronological order</li> <li><input type="checkbox"/> search for selected records for a report</li> <li><input type="checkbox"/> modify reports: add / delete / adjust</li> </ul>	<ul style="list-style-type: none"> <li>- fields and records</li> <li>- titles, headings,</li> <li>- text, numbers, dates</li> <li>- column width</li> <li>- font types and sizes, text and numbers (\$,% ,)</li> <li>- text styles and field alignments</li> <li><input type="checkbox"/> save / delete / preview / print reports</li> </ul>	2	<p><b>Format Reports</b> - continue use of all software functions at the introductory level plus</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> create and use macros</li> <li><input type="checkbox"/> merge databases with other documents</li> <li><input type="checkbox"/></li> </ul>

<b>Competency Level</b>	4. <u>Consistently</u> demonstrates <u>all</u> of the designated techniques efficiently without prompting.	3. <u>Usually</u> demonstrates <u>all</u> of the designated techniques efficiently, <u>seldom</u> needs prompting.	2. <u>Generally</u> demonstrates <u>most</u> of the designated techniques, <u>seldom</u> needs prompting.	1. Can demonstrate designated techniques, but occasionally needs prompting	0. Cannot demonstrate designated techniques
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Appendix K Revised Checklist: Databases (Intermediate)

**ASSESSMENT CHECKLIST: DATABASES (DB)**

*Intermediate Level (INF207)*

INFDB-207

STUDENT: \_\_\_\_\_

DATE: \_\_\_\_\_

<b>Instructions</b>	Apply the rating scale to each item on this checklist. If the particular technique has not been demonstrated by the student, assign zero. If the particular technique has been demonstrated by the student, assign the number on the rating scale that corresponds with the amount of prompting the student required to complete the technique. Students must demonstrate the techniques through the use of software functions noted in the checklists below and in the preparation of well designed and accurate documents. Note: Those techniques indicated by an asterisk (*) may need to be adjusted to reflect software and hardware that is available.
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Rating Scale	0) Cannot demonstrate the designated technique.	1) Can demonstrate the designated technique, but frequently needs prompting.	2) Can demonstrate the designated technique, occasionally needs prompting.	3) Can demonstrate the designated technique, rarely needs prompting.	4) Can demonstrate the designated technique efficiently, without prompting.
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<b>SECTION A</b>	<b>Formatting Techniques for Fields, Records, and Forms</b>				
<b>File Management</b>	<input type="checkbox"/> use help function	<input type="checkbox"/> align field - left	<input type="checkbox"/> insert footer	<input type="checkbox"/> create records in list view	<input type="checkbox"/> page break in list view
<input type="checkbox"/> create new file	<input type="checkbox"/> create fields using form view	<input type="checkbox"/> align field - right	<input type="checkbox"/> insert header	<input type="checkbox"/> preview records in form view	<input type="checkbox"/> page break in form view
<input type="checkbox"/> save new file (save as)	<input type="checkbox"/> create fields using list view	<input type="checkbox"/> align field - center	<input type="checkbox"/> insert pagination	<input type="checkbox"/> print records in form view	<input type="checkbox"/> lock fields
<input type="checkbox"/> open file	<input type="checkbox"/> specify size of field	<input type="checkbox"/> use bold	<input type="checkbox"/> format commas	<input type="checkbox"/> preview records in list view	<input type="checkbox"/> unlock fields
<input type="checkbox"/> close file	<input type="checkbox"/> enter text	<input type="checkbox"/> use underscore	<input type="checkbox"/> format decimals	<input type="checkbox"/> print records in list view	<input type="checkbox"/> view DB - list view
	<input type="checkbox"/> enter numbers	<input type="checkbox"/> use italics	<input type="checkbox"/> format numbers	<input type="checkbox"/> preview records - portrait	<input type="checkbox"/> insert a split
	<input type="checkbox"/> enter formula	<input type="checkbox"/> use different font styles	<input type="checkbox"/> format percentages	<input type="checkbox"/> print records - portrait	<input type="checkbox"/> move a split
	<input type="checkbox"/> create calculated field	<input type="checkbox"/> use different font sizes	<input type="checkbox"/> format currency amounts	<input type="checkbox"/> preview records - *landscape	<input type="checkbox"/> remove a split
			<input type="checkbox"/> create records in form view	<input type="checkbox"/> print records - *landscape	<input type="checkbox"/> lock form design

<b>SECTION B</b>	<b>Working With *Keys/Mouse</b>		<b>Editing Techniques</b>		<b>Sorting and Searching Techniques</b>	
<input type="checkbox"/> move cursor	<input type="checkbox"/> use page up key	<input type="checkbox"/> use page down key	<input type="checkbox"/> insert fields	<input type="checkbox"/> copy data within a DB	<input type="checkbox"/> locate specific records	<input type="checkbox"/> specific range search - alphabetic
<input type="checkbox"/> use *go to key	<input type="checkbox"/> use arrow keys	<input type="checkbox"/> use *scroll bar	<input type="checkbox"/> delete fields	<input type="checkbox"/> move data within a DB	<input type="checkbox"/> sort alphabetically	<input type="checkbox"/> specific range search - numbers
<input type="checkbox"/> use *select key	<input type="checkbox"/> use tab key	<input type="checkbox"/> highlight fields	<input type="checkbox"/> enter text in field	<input type="checkbox"/> paste data within a DB	<input type="checkbox"/> sort numerically	<input type="checkbox"/> use query - dates
<input type="checkbox"/> use home key			<input type="checkbox"/> enter numbers in field	<input type="checkbox"/> adjust field size	<input type="checkbox"/> search records - matches	<input type="checkbox"/> use query - wildcards
<input type="checkbox"/> use end key			<input type="checkbox"/> enter dates in field	<input type="checkbox"/> insert manual page breaks	<input type="checkbox"/> search records above values	<input type="checkbox"/> query - mathematical functions
			<input type="checkbox"/> vary field alignments	<input type="checkbox"/> delete manual page breaks	<input type="checkbox"/> search records below values	<input type="checkbox"/> search - multiple conditions

<b>SECTION C</b>	<b>Report Management</b>				
<input type="checkbox"/> add a report	<input type="checkbox"/> create a macro	<input type="checkbox"/> add report title	<input type="checkbox"/> calculate column statistics	<input type="checkbox"/> search for selected records	<input type="checkbox"/> preview report
<input type="checkbox"/> delete a report	<input type="checkbox"/> utilize macro	<input type="checkbox"/> select fields for a report	<input type="checkbox"/> sort reports - alphabetically	<input type="checkbox"/> add a heading	<input type="checkbox"/> print report
<input type="checkbox"/> save a report	<input type="checkbox"/> merge documents	<input type="checkbox"/> calculate row statistics	<input type="checkbox"/> sort reports - numerically	<input type="checkbox"/> delete a heading	

**Overall Averages**    **SECTION A** \_\_\_\_\_    **SECTION B** \_\_\_\_\_    **SECTION C** \_\_\_\_\_    **MODULE GRADE** \_\_\_\_\_