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Online Learning Tools and Assessments

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Abstract

This action research paper explores online learning tools and exam scores in an online Introduction to Computer Science course. The original goal was to find new learning objects not included in the course materials, but instead explored if there is a direct correlation between learning objects used (types and numbers), and exam scores. This paper will conclude with recommendations for Best Practices in developing online courses and will explain how to evaluate your students' success in the course.

ONLINE LEARNING TOOLS AND ASSESSMENTS

Research Question/Focus

The focus of this action research project is how to determine how learning tools and objects affect student assessment scores in online classes. Of course, I can not dictate which tools the student will use, but I should employ many different types of tools in order to meet the learning styles of the students. This research project focused on using several learning tools including PowerPoints (with audio and without), crossword puzzles, self-assessment quizzes, discussion questions, written assignments, key terms defined, written summaries, and even the textbook. I tried to give my students as many opportunities as possible to put their hands on the information for instance through the discussion questions and the assignments in following the constructivist theory (Jonassen, 2005). The self-quizzes helped the student self-assess their knowledge of the material in each module while the actual exam of the three modules were used as a scored assessment. This project looks at which and how many tools the students used and if it appears those tools affected the exam outcome. I also requested additional tool ideas from the students, hoping for open-ended input to improve the course.

Review of Related Literature

Distance education is not a new educational method by any means; however, using the internet is a new way of delivery to students. As online education has developed, it has been studied and researched in many ways to find the effective methods of teaching the students the material.

An online class is not a teacher-based class, but rather a class that is facilitated by the instructor. Most online classes might include a PowerPoint lecture in the class, but for the most part, the learners are responsible for their own learning. Online learning lends to the constructivist theory where the student constructs his or her knowledge through the tools provided by the instructor. Instead of the instructor being in front of the class lecturing, the instructor helps the student construct his or her knowledge by guiding him or her through various exercises and learning tools. Discussion questions that apply the knowledge from the textbook are very popular in constructivist theory, as are assignments that promote critical thinking. However, other tools are needed to meet learning styles of students, including tools that have an auditory component (for the auditory learner), a written component (for the kinesthetic learner) and hands-on component (for the kinesthetic learner).

So what tools are there to provide for students? Of course there are discussion boards and assignments you can turn in through the Web interface. There are also synchronous chats, for those students who need to talk through the information. Synchronous chats can be held through a written interface, or through a combination of written and voice interface. Centra® is one such example of a dual interface. PowerPoints with audio lectures provided by the instructor help the auditory and

visual learner to deeply absorb the information. Podcasts also assist the auditory learner and are very easy for the instructor to create. For the kinesthetic learner, learning tools such as crossword puzzles for key terms, search-a-words, labeling activities, drag 'n drops, flash cards, sorting activities, ordering activities, and self-quizzes help the student to put their hands on the information and really internalize it. Quiz poppers also help reinforce the information after the student has read or listened to the materials.

Quality online classes, as described and defined by the *Quality Matters Rubric*™ contain all these tools and more. A *Quality* class is not just defined by the tools provided, though. It includes the atmosphere and physical design of the class. Can a student get into the class and find the material needed easily? A good navigational structure is important so the student doesn't get frustrated in trying to find the information he or she needs to succeed. Does the syllabus clearly define what the student needs to do to succeed in the class? Are the students given an opportunity to get to know each other in the class through introductory activities? Students must have this opportunity to combat the isolation commonly felt in an online class. The isolation and disconnect from the class will lead to the student not engaging in the class and ultimately not doing as well as he or she could have.

Quality classes also clearly define the learning objectives in the class and which activities lead to learning those objectives. All assessments and measurements used appropriately gauge if the student is learning the information and the grading policy is in place and easy to understand for the student. Also included in assessments are the

self-quizzes so the student can get instant feedback on his or her knowledge level and doesn't have to wait for the instructor to return feedback.

All instructional materials should be easily accessible by the student, which means they should not take a long time to download for even dial-up students, and they should be able to be found in the navigational structure easily. It is interesting to know that the rubric states all resources and materials should be properly cited. Instructors should always remember they are setting the example for their students. A *Quality* class should also make sure there is plenty of interaction, not just between the student and instructor, but also between the students. This is called creating a learning community. The students should feel comfortable with each other to begin dialogue about the material or discuss it in depth. Student to student support is essential in online classes so the student feels engaged and active in the classroom (Conrad and Donaldson, 2003). This can be accomplished through synchronous chats or asynchronous discussion postings. The instructor must also set an example by being engaged in the course, also. He or she should respond appropriately to student postings and facilitate the discussion by possibly probing further through questions posted on the discussion board. By doing this, the student will understand better how he or she should participate.

The course technology for delivering the course is almost always "forced" upon the instructor by the institution. However, this should not be a drawback. The instructor can work within that system and still add more tools for students by using additional software for creating his or her course, like Softchalk™ LessonBuilder or Impatica for Powerpoint™, just to name two such programs. When building the course, though, a

Quality course keeps in mind the dial-up student and assures that each student can participate fully and have all access to all the tools. This may not be an easy task at times, but the Instructional Technologist should be able to assist with any problems that might arise.

A Quality course by any description, is a huge undertaking, but should be expected by instructors and administration. It's no less than any student deserves or desires. He is, after all, seeking an education, and it is the institution's responsibility to provide the tools for the student to obtain that education.

Methodology, Participants and Context

The participants of this study were 34 students in an introductory Computer Science course that was delivered in an online capacity using WebCT CE 4.1. These adult students had no face-to-face interaction with me through the semester. The students were all new to the online educational environment except for one student who had taken online courses before at another community college. I created the learning objects used in the online class based on information from the textbook publisher, and created my lectures using PowerPoint. Audio was used to enhance the PowerPoints in the first three modules, but was not used in the next three modules.

The course was developed using the "Quality Matters Rubric" (see Appendix A) and used many learning tools because it is encouraged by the rubric to do so and because of my personal experience and knowledge about online course delivery (see

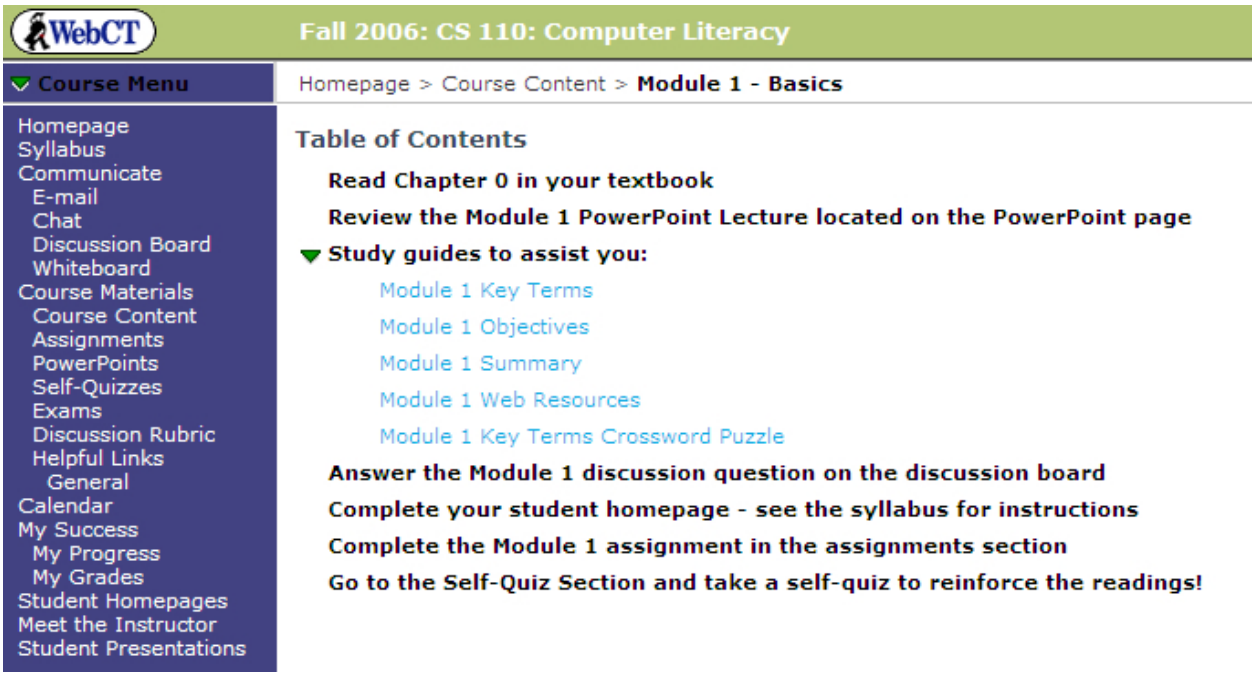


Figure 1

Literature Review). These tools were included in a content module setting, with a list of each tool available for each Module. The content module contained links or suggested links to: the textbook, the PowerPoint lecture, key terms list, objectives, summary, additional web resources, discussion question, assignment, and self-quiz (see Figure 1). These learning tools allowed the student to put their hands on the information and internalize the information, provided they chose to do so. The only required learning tools were the assignment and the discussion question, and they were graded as an assessment.

The first module had two additional learning tools: a student homepage (for orientation and getting to know one another in an online environment) and a crossword puzzle which used the key terms. The crossword puzzle could re-generate new puzzles with the key terms entered so the student could do the puzzle countless times to assist in learning the technology terms.

Each module covered one chapter in the book. An assignment and a discussion question were "due" each module. The student was required to answer the original discussion question and then respond to a fellow student at least once on a different day from the original posting. This was to encourage interaction between the students about the module topic, and was fairly successful. The discussion question, which was posted on Saturday morning, typically applied the textbook chapter to their lives in some way (Dewey). The student received 10 points for answering the original discussion question and an additional 10 points if she or he answered a fellow student on a different day.

The assignment also was a critical thinking assignment and was never a straight answer out of the book. This frustrated the students the first two modules, but after an e-mail from me, they understood the purpose of the questions. Each assignment was worth 40 points and was due on Friday evening.

After three modules, the students were then given an exam. This exam was a 40 question multiple choice, randomized exam that had been provided by the textbook publisher. The exam chose 40 questions for each student randomly out of a test bank of approximately 150 questions, divided evenly between the three modules. These questions were from the textbook publisher, so they met the objectives of each chapter and assessed the student on what the textbook presented, not necessarily what I wanted the students to learn. The students received one point for each correct answer, for a possible 40 on each exam.

Research Design & Procedure

The research tools I used included two surveys to the students to understand which tools they used and found effective and then additional tools they suggested for future use. With WebCT CE 4.1, it's impossible to see which tools they even looked at unless they are loaded into a content module page. Most of the tools that were really interactive were not able to be loaded into the content module, but had links to those areas. I also downloaded the gradebook to look at the student's individual grades and compare them to the tools they used each module.

After the students completed the first six modules of work in the course (six weeks into the course), I sent out an anonymous survey regarding both modules of work. The questions included which tools the students used for each individual module, and then what tools they found helped them, along with a suggestion box where the student could suggest a new tool I had not incorporated into the class. As I began compiling the data, I realized that I really needed the students' names so I could compare what they reported in the survey to their assessment scores. So a week later, I issued the survey again (see Appendix B and C), but this time it was not anonymous and the students who participated in the survey knew it was not anonymous.

I did realize that my students did not necessarily pay attention when filling out the surveys, so I was forced to "throw away" some of the results. Several students marked that a particular learning tool helped them, but they did not choose the tool as one they had used for that module. I also had a few students only fill out one survey. Because this was a comparative project, I was unable to use their responses at all.

Twenty-two students took the survey, but because of invalid results, only 12 students' surveys were accepted into the research.

In addition to the surveys, I also contacted several students through e-mail for interviews to understand why they used the tools they did. I did this in a specialized sample as I came across data that confused me or intrigued me about that particular student. It helped personalize the data more and helped me understand the students and their needs better.

Analysis, Interpretation & Results

The analysis did not prove what I thought it would, or what I wanted to as opposed to my original research question. However, I did learn many new things about students' online learning abilities and needs.

The original research question was to find a direct correlation between use of specific online learning tools and exam scores. This was an impossible task for two main reasons: 1) I introduced them to many online learning tools, so they were able to pick and choose which tools worked best for them, and 2) there were many external factors I was unable to control that affected their exam grades. For example, one of my students was put into the hospital in the middle of the third module set, so she missed a week of school, as did her mother-in-law, who was another student in my class. Had they not missed that week of classes and module work, they probably would have done better on the third exam.

So after realizing my data didn't correspond to my research question, I faced a dilemma. What did my data prove? It proved and disproved many things in my preconceived ideas and study of online education and adult students. First, I looked at each module and which tools were used and which were found effective. The evidence showed that some tools were more effective than others (see charts in Appendix D) in preparing the student for the exam, including the textbook, the PowerPoint, the discussion question, the assignment, the key terms, and the self-quiz. The most used resources included the textbook and the assignment (see chart below). Surprisingly, the discussion question was ranked as the fifth ranked most used tool, which makes me

realize there is an error in that data, as each student was required to do the discussion. Not all students complied, but more students complied than the survey stated.

Learning Tool Used	Modules 1-3	Modules 4-6	Total times used
Textbook	47	50	97
Assignment	38	41	79
Self-Quiz	37	32	69
PowerPoint	34	33	67
Discussion Question	30	36	66
Key Terms	32	33	65
Summary	14	18	32
Web Resources	12	13	25
Objectives	13	2	15
Crossword Puzzle	1	0	1

Table 1: Learning Tools Used In Order of Most Used

Next I looked at the student-ranked effectiveness of the tools used (see Table 2). They were fairly consistent with the order of usage, however, the self-quizzes showed a significant drop in usefulness to the student. While the tool was used 69 times in the six modules, it was ranked effective only 52 times. So the data suggests that basically if the tool is used, it is or can be found effective to help the student. I found it interesting that

the one student who used the crossword puzzle found it effective. That has spurred me to created crossword puzzles for my other modules for later classes.

Learning Tool Effectiveness	Modules 1-3	Modules 4-6	Total Effectiveness
Textbook	47	46	93
Assignment	35	33	68
PowerPoint	29	31	60
Key Terms	29	31	60
Discussion Question	24	36	60
Self-Quiz	29	23	52
Summary	9	13	22
Web Resources	6	7	13
Objectives	4	2	6
Crossword Puzzle	1	0	1

Table 2: Learning Tools Effectiveness (Student rated)

Next I looked at individual student data. Although I had 22 and 23 students fill out the forms, I was only able to keep the data of 12 of the students for tool to exam score comparisons. I also added in the data of how they did on their assignments and discussions for each three module section (see Table 3). I wanted to explore the possibility that the number of tools used each module corresponded directly to their exam score. So in looking at the number of tools used, I expected to see that if a student used more tools in one module set, then his or her exam grade would be higher than in the other set. This did not hold true in all cases.

	Module 1-3 Discussions	Modules 1-3 Assignment	Number of tools used - Exam 1	Exam 1
Student 1	60	57	4	14
Student 2	60	58	6	25
Student 3	60	59	3	19
Student 4	60	49	6	31
Student 5	50	54	7	19
Student 6	40	55	8	27
Student 7	40	58	8	24
Student 8	40	55	8	29
Student 9	60	57	4	26
Student 10	30	33	6	13
Student 11	30	60	7	34
Student 12	60	60	6	32
Average:	49	55	6	24
Median:	55	57	6	25.5
High score:	60	60	8	34
Low score:	30	33	3	13

Table 3: Modules 1-3 Assessment Scores and Tools Used

In looking at the first three modules and the exam, the student who scored the highest on the exam (Student 11) used seven of the tools available, which was higher than the average amount of tools used. The student who scored the lowest on the exam used the average amount of tools. However, that student also scored the lowest on the discussions and the assignment, which leads me to believe that it's a combination of all the tools and assignments and the application of the material. That fact is strengthened when you look at the second lowest score. Student 1 scored high in the discussion and assignment, yet only used four of the tools provided, with discussion and assignment being two of those tools. So the first three modules indicate that their exam success depended on how many tools they used AND how well they participated in discussion and assignments.

	Module 4-6 Discussion	Modules 4-6 Assignment	Number of tools used - Exam 2	Exam 2	Difference between Exam 1 and 2 Scores	Difference between number of tools used
					Positive indicates lower Exam 2 score	*Positive indicates lower number of tools used for Exam 2*
Student 1	60	39	5	13	1	-1
Student 2	60	60	6	26	-1	0
Student 3	60	58	4	24	-5	-1
Student 4	60	44	5	26	5	1
Student 5	60	52	5	14	5	2
Student 6	50	59	4	26	1	4
Student 7	30	32	4	17	7	4
Student 8	60	60	8	15	14	0
Student 9	60	59	4	25	1	0
Student 10	0	39	5	22	-9	1
Student 11	20	20	6	27	7	1
Student 12	60	60	6	39	-7	0

Table 4: Modules 4-6 Assessment Scores and Tools Used

Now looking at Modules 4-6, we see a different picture appear. I expected to see in a comparison between the two exam scores that those students who scored higher on one exam would have used more tools to prepare for that exam. That does not always hold true, nor is it in direct proportion to the number of tools used. The largest stand-out of this is Student 8 who scored 14 points higher on Exam 1 than Exam 2. However, in comparing assignments and discussions, the student participated MORE in Exam 2 preparation than in Exam 1. There was also NO DIFFERENCE in the number of tools used for each module set. This student did not report any difficulty with the material and appeared to have a good grasp of it in her assignments and discussions. Another student who shows similar results is Student 10. That student scored higher on Exam 2 than Exam 1, but did not participate in discussions at all in that module set and scored

low on her assignments. She also used one less tool in preparation for Exam 2. In looking at her Exam 1 score, one might say she had no where to go but up, but I'm not sure the data shows WHY she made such a high score when her study habits indicate she should have done much poorer. Other students in the mid-range (see Students 5 and 7) did show improvement in their test scores when they used additional learning tools.

I interviewed one student specifically because she had complained about not having the audio available on the second module set on the PowerPoints. This student explained to me she was an auditory learner and "needed" the audio in the PowerPoints and that it helped her retain the information better. However, in looking at her exam scores (Student 12), she scored much higher on Exam 2 than on Exam 1. She completed all assignments and discussions in both module sets and used the same number of tools. Is it because she compensated for not having audio to listen to in the 2nd exam? In her interview she stated that she had not taken classes in six years and had never taken an online class. Because of that, it took the first three modules and exam to "get in the swing of things." Once she felt more comfortable with the online learning environment and knew what to expect in the exams, she did much better on the second exam, increasing her score by 7 points.

	Modules 1-3 Discussions	Modules 1-3 Assignment	Number of tools used - Exam 1	Exam 1	Modules 4-6 Discussion	Modules 4-6 Assignment	Number of tools used - Exam 2	Exam 2
Average scores:	49	55	6	24	48	49	5	23
Median scores:	55	57	6	25.5	60	55	5	24.5
High score:	60	60	8	34	60	60	8	39
Low score:	30	33	3	13	0	20	4	13

Table 5

In looking at the exam score averages (see Table 5), I was surprised to see that the Exam 2 score was lower than the Exam 1 score. Tradition indicates that students should do better on the second exam because they will know what to expect on the exam delivery. However, these statistics did not prove that out. Students on average used more of the learning tools for the first exam than on the second exam, and their assignment and discussion scores were higher on average for the first exam than the second exam. On average, that indicates that the more learning tools are used, the better the student is prepared for the exam.

Conclusion, Recommendations, and Plan of Action

Results indicate that the number of learning tools used does improve assessment scores, and that the majority of students who completed the discussion and assignment do better on their test scores. As a "best practice", I would recommend that an online instructor should have as many learning tools available to students as possible to assist them in their learning of the material presented. Each student chose a different set of tools to use, and were as effective as the student allowed them to be. I did discover that while the objectives and summaries were used slightly, they were not very useful for the student as a learning tool. I will continue to use those in my content module, but will consider them informational only and not learning tools. I do not recommend assuming that because a student didn't do well on her assignments or discussions that she is struggling in the class. Rather, I would recommend an opening of a dialogue between the facilitator and student to see if something else is happening in her life that is pulling her away from meeting the deadlines of the assignments.

APPENDIX A

Quality Matters Peer Course Review Rubric

Quality Matters: Inter-Institutional Quality Assurance in Online Learning

PEER COURSE REVIEW
RUBRIC
(FY 05/06))

I. COURSE OVERVIEW AND INTRODUCTION

General Review Standard: The overall design of the course, navigational information, as well as course, instructor and student information are made transparent to the student at the beginning of the course.

Specific Review Standards:	Points	Yes	No	Notes
I.1 Navigational instructions make the organization of the course easy to understand.	3			
I.2 A statement introduces the student to the course and to the structure of the student learning.	3			
I.3 Netiquette expectations with regard to discussions and email communication are clearly stated.	2			
I.4 The self-introduction by the instructor is appropriate.	1			
I.5 Students are requested to introduce themselves to the class.	1			
I.6 Minimum technology requirements, minimum student skills, and, if applicable, prerequisite knowledge in the discipline, are clearly stated.	1			

Comments and Recommendations: The following comments and recommendations by the review team are designed to assist in advancing implementation of the General Standard to the next level or in refining accomplishments

II. LEARNING OBJECTIVES (COMPETENCIES)

General Review Standard: Learning objectives are clearly defined and explained. They assist the student to focus learning activities.

Specific Review Standards:	Points	Yes	No	Notes
II.1 The learning objectives of the course describe outcomes that are measurable.	3			
II.2 The learning objectives address content mastery, critical thinking skills, and core learning skills.	3			
II.3 The learning objectives of the course are clearly stated and understandable to the student.	2			
II.4 Instructions to students on how to meet the learning objectives are adequate and easy to understand.	2			
II.5 The learning objectives of the course are articulated and specified on the module/unit level.	2			

Comments and Recommendations: The following comments and recommendations by the review team are designed to assist in advancing implementation of the General Standard to the next level or in refining accomplishments

III. ASSESSMENT AND MEASUREMENT

General Review Standard: Assessment strategies use established ways to measure effective learning, assess student progress by reference to stated learning objectives, and are designed as essential to the learning process.

Specific Review Standards:	Points	Yes	No	Notes
III.1 The types of assessments selected measure the stated learning objectives and are consistent with course activities and resources.	3			
III.2 The grading policy is transparent and easy to understand.	3			
III.3 Assessment and measurement strategies provide feedback to the student.	3			
III.4 The types of assessments selected and the methods used for submitting assessments are appropriate for the distance learning	2			

	environment.				
III.5	"Self-check" or practice types of assignments are provided for quick student feedback.	1			

Comments and Recommendations: The following comments and recommendations by the review team are designed to assist in advancing implementation of the General Standard to the next level or in refining accomplishments

IV. RESOURCES AND MATERIALS

General Review Standard: Instructional materials are sufficiently comprehensive to achieve announced objectives and learning outcomes and are prepared by qualified persons competent in their fields. (Materials, other than standard textbooks produced by recognized publishers, are prepared by the instructor or distance educators skilled in preparing materials for distance learning.)

Specific Review Standards:		**Points**	**Yes**	**No**	**Notes**
IV.1	The instructional materials support the stated learning objectives and have sufficient breadth and depth for the student to learn the subject.	3			
IV.2	Instructional materials are presented in a format appropriate to the online environment, and are easily accessible to and usable by the student.	3			
IV.3	The purpose of the course elements (content, instructional methods, technologies, and course materials) is evident.	2			
IV.4	The instructional materials, including supporting materials - such as manuals, videos, CD ROMs, and computer software – are consistent in organization.	1			
IV.5	All resources and materials used in the online course are appropriately cited.	1			

Comments and Recommendations: The following comments and recommendations by the review team are designed to assist in advancing implementation of the General Standard to the next level or in refining accomplishments

V. LEARNER INTERACTION

General Review Standard: The effective design of instructor-student interaction, meaningful student cooperation, and student-content interaction is essential to student motivation, intellectual commitment and personal development.

Specific Review Standards:	Points	Yes	No	Notes
V.1 The learning activities promote the achievement of stated objectives and learning outcomes.	3			
V.2 Learning activities foster instructor-student, content-student, and if appropriate to this course, student-student interaction.	3			
V.3 Clear standards are set for instructor response and availability (turn-around time for email, grade posting, etc.)	3			
V.4 The requirements for course interaction are clearly articulated.	2			
V.5 The course design prompts the instructor to be present, active, and engaged with the students.	2			

Comments and Recommendations: The following comments and recommendations by the review team are designed to assist in advancing implementation of the General Standard to the next level or in refining accomplishments

VI. COURSE TECHNOLOGY

General Review Standard: To enhance student learning, course technology enriches instruction and fosters student interactivity.

Specific Review Standards:	Points	Yes	No	Notes
VI.1 The tools and media support the learning objectives of the course and are integrated with texts and lesson assignments.	3			
VI.2 The tools and media enhance student interactivity and guide the student to become a more active learner.	2			
VI.3 Technologies required for this course are either provided or easily downloadable.	2			
VI.4 The tools and media are compatible with existing standards of delivery modes.	1			

VI.5 Instructions on how to access resources at a distance are sufficient and easy to understand.	1			
VI.6 Course technologies take advantage of existing economies and efficiencies of delivery.	1			

Comments and Recommendations: The following comments and recommendations by the review team are designed to assist in advancing implementation of the General Standard to the next level or in refining accomplishments

VII. LEARNER SUPPORT

General Review Standard: Courses are effectively supported for students through fully accessible modes of delivery, resources, and student support.

Specific Review Standards:	**Points**	**Yes**	**No**	**Notes**
VII.1 The course instructions articulate or link to a clear description of the technical support offered.	2			
VII.2 Course instructions articulate or link to an explanation of how the institution's academic support system can assist the student in effectively using the resources provided.	2			
VII.3 Course instructions articulate or link to an explanation of how the institution's student support services can assist the student in effectively using the resources provided.	1			
VII.4 Course instructions articulate or link to tutorials and resources that answer basic questions related to research, writing, technology etc.	1			

Comments and Recommendations: The following comments and recommendations by the review team are designed to assist in advancing implementation of the General Standard to the next level or in refining accomplishments

VIII. ADA COMPLIANCE

General Review Standard: The course is accessible to all students.

Specific Review Standards:	**Points**	**Yes**	**No**	**Notes**
VIII.1 The course acknowledges the importance of ADA	3			

	requirements.				
VIII.2	Web pages provide equivalent alternatives to auditory and visual content.	1			
VIII.3	Web pages have links that are self-describing and meaningful.	1			
VIII.4	The course demonstrates sensitivity to readability issues.	1			

Comments and Recommendations: The following comments and recommendations by the review team are designed to assist in advancing implementation of the General Standard to the next level or in refining accomplishments

Final Comments: Now that you've looked at the entire course, please share your reflections on the degree of coherence of the course as a whole and its potential to promote student learning.

TOTAL POINTS (out of 80 possible):	

Meets Expectations if:

Answered 'Yes' to all 3-point Essential Standards: I.1, I.2, II.1, II.2, III.1, III.2, III.3, IV.1, IV.2, V.1, V.2, V.3, VI.1, VIII.1

AND

68 points or more

APPENDIX B

Survey 1

Question 1 (1 point)
For Module 1, check which learning tools you used to study with...

- a. The chapter in the textbook.
- b. PowerPoint.
- c. Key Terms.
- d. Objectives.
- e. Summary.
- f. Web Resources.
- g. Crossword Puzzle.
- h. Discussion Question.
- i. Assignment.
- j. Self-Quiz.

Save answer

Question 2 (1 point)
For Module 2, check which learning tools you used to study with...

- a. The chapter in the textbook.
- b. PowerPoint.
- c. Key Terms.
- d. Objectives.
- e. Summary.
- f. Web Resources.
- g. Discussion Question.
- h. Assignment.
- i. Self-Quiz.

Save answer

Question 3 (1 point)

For Module 3, check which learning tools you used to study with...

- [ ] a. The chapter in the textbook.
- [ ] b. PowerPoint.
- [ ] c. Key Terms.
- [ ] d. Objectives.
- [ ] e. Summary.
- [ ] f. Web Resources.
- [ ] g. Discussion Question.
- [ ] h. Assignment.
- [ ] i. Self-Quiz.

Save answer

Question 4 (1 point)

For Module 1, check which learning tools you felt helped you understand the information presented better

- [ ] a. The chapter in the textbook.
- [ ] b. PowerPoint.
- [ ] c. Key Terms.
- [ ] d. Objectives.
- [ ] e. Summary.
- [ ] f. Web Resources.
- [ ] g. Crossword Puzzle.
- [ ] h. Discussion Question.
- [ ] i. Assignment.
- [ ] j. Self-Quiz.

Save answer

Question 5 (1 point)

For Module 2, check which learning tools you felt helped you understand the information presented better

- [ ] a. The chapter in the textbook.

- b. PowerPoint.
- c. Key Terms.
- d. Objectives.
- e. Summary.
- f. Web Resources.
- g. Discussion Question.
- h. Assignment.
- i. Self-Quiz.

Save answer

Question 6 (1 point)

For Module 3, check which learning tools you felt helped you understand the information presented better

- a. The chapter in the textbook.
- b. PowerPoint.
- c. Key Terms.
- d. Objectives.
- e. Summary.
- f. Web Resources.
- g. Discussion Question.
- h. Assignment.
- i. Self-Quiz.

Save answer

Question 7 (1 point)

What activity or activities would have helped you understand the material better in Module 1?

Answer:

Save answer

Question 8 (1 point)

What activity or activities would have helped you understand the material better in Module 2?

Answer:

Save answer

Question 9 (1 point)

What activity or activities would have helped you understand the material better in Module 3?

Answer:

Save answer

Question 10 (1 point)

What grade did you make on the Module 1-3 exam?

- a. A
- b. B
- c. C
- d. D
- e. F
- f. Didn't take the exam

Save answer

Finish Help

APPENDIX C

Survey 2

Question 1 (points)
For Module 4, check which learning tools you used to study with...

- ☐ a. The chapter in the textbook.
- ☐ b. PowerPoint.
- ☐ c. Key Terms.
- ☐ d. Objectives.
- ☐ e. Summary.
- ☐ f. Web Resources.
- ☐ g. Crossword Puzzle.
- ☐ h. Discussion Question.
- ☐ i. Assignment.
- ☐ j. Self-Quiz.

Save answer

Question 2 (points)
For Module 5, check which learning tools you used to study with...

- ☐ a. The chapter in the textbook.
- ☐ b. PowerPoint.
- ☐ c. Key Terms.
- ☐ d. Objectives.
- ☐ e. Summary.
- ☐ f. Web Resources.
- ☐ g. Discussion Question.
- ☐ h. Assignment.
- ☐ i. Self-Quiz.

Save answer

Question 3 (points)

For Module 6, check which learning tools you used to study with...

- ☐ a. The chapter in the textbook.
- ☐ b. PowerPoint.
- ☐ c. Key Terms.
- ☐ d. Objectives.
- ☐ e. Summary.
- ☐ f. Web Resources.
- ☐ g. Discussion Question.
- ☐ h. Assignment.
- ☐ i. Self-Quiz.

Save answer

Question 4 (points)

For Module 4, check which learning tools you felt helped you understand the information presented better

- ☐ a. The chapter in the textbook.
- ☐ b. PowerPoint.
- ☐ c. Key Terms.
- ☐ d. Objectives.
- ☐ e. Summary.
- ☐ f. Web Resources.
- ☐ g. Crossword Puzzle.
- ☐ h. Discussion Question.
- ☐ i. Assignment.
- ☐ j. Self-Quiz.

Save answer

Question 5 (points)

For Module 5, check which learning tools you felt helped you understand the information presented better

- ☐ a. The chapter in the textbook.

- b. PowerPoint.
- c. Key Terms.
- d. Objectives.
- e. Summary.
- f. Web Resources.
- g. Discussion Question.
- h. Assignment.
- i. Self-Quiz.

Save answer

Question 6 (points)

For Module 6, check which learning tools you felt helped you understand the information presented better

- a. The chapter in the textbook.
- b. PowerPoint.
- c. Key Terms.
- d. Objectives.
- e. Summary.
- f. Web Resources.
- g. Discussion Question.
- h. Assignment.
- i. Self-Quiz.

Save answer

Question 7 (points)

What activity or activities would have helped you understand the material better in Module 4?

Answer:

Save answer

Question 8 (points)

What activity or activities would have helped you understand the material better in Module 5?

Answer:

Save answer

Question 9 (points)

What activity or activities would have helped you understand the material better in Module 6?

Answer:

Save answer

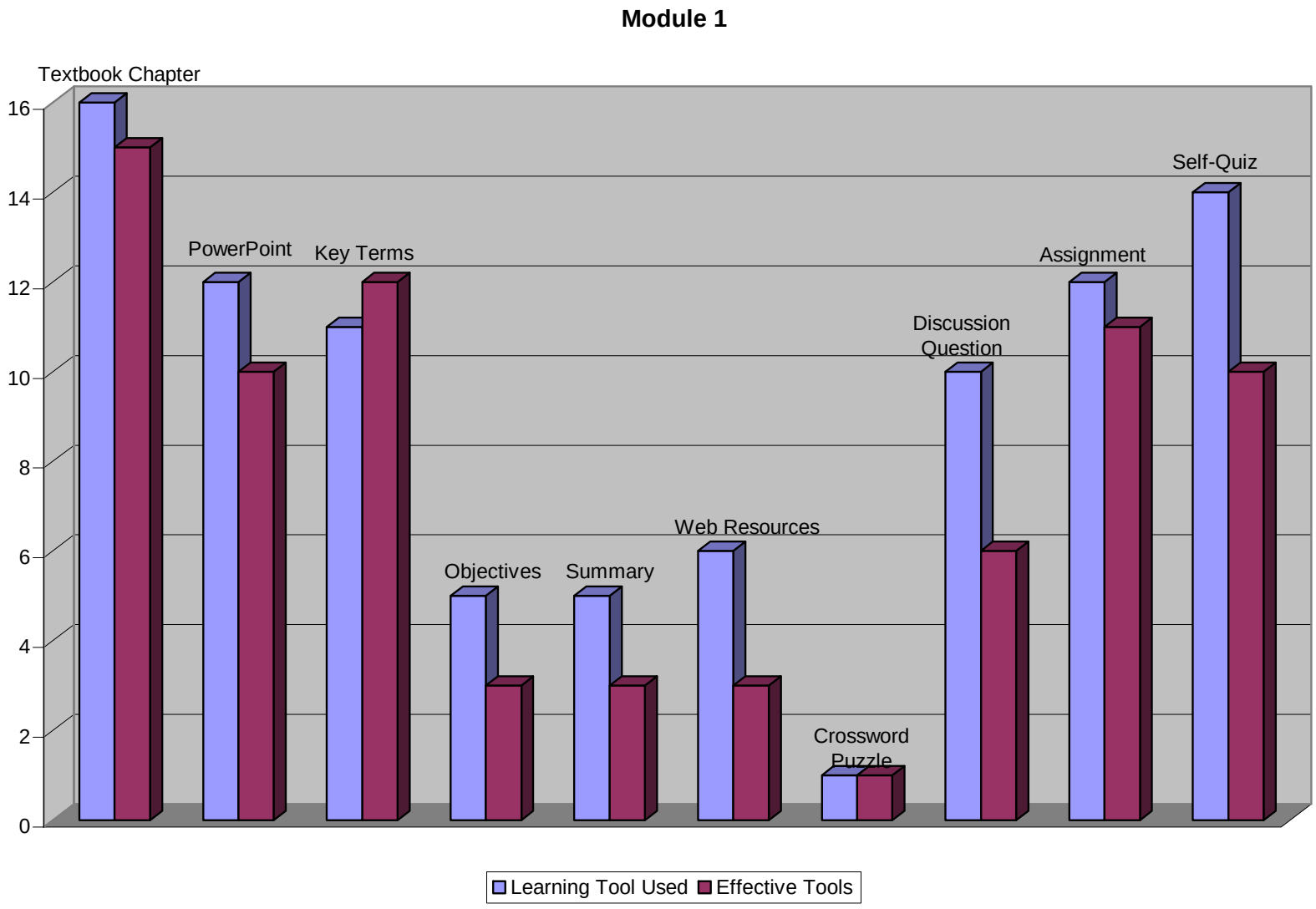
Question 10 (points)

What grade did you make on the Module 4-6 exam?

- a. A
- b. B
- c. C
- d. D
- e. F
- f. Didn't take the exam

Save answer

APPENDIX D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PowerPoint
Key Terms
Objectives
Summary
Web Resources
Crossword Puzzle
Discussion Question
Assignment
Self-Quiz
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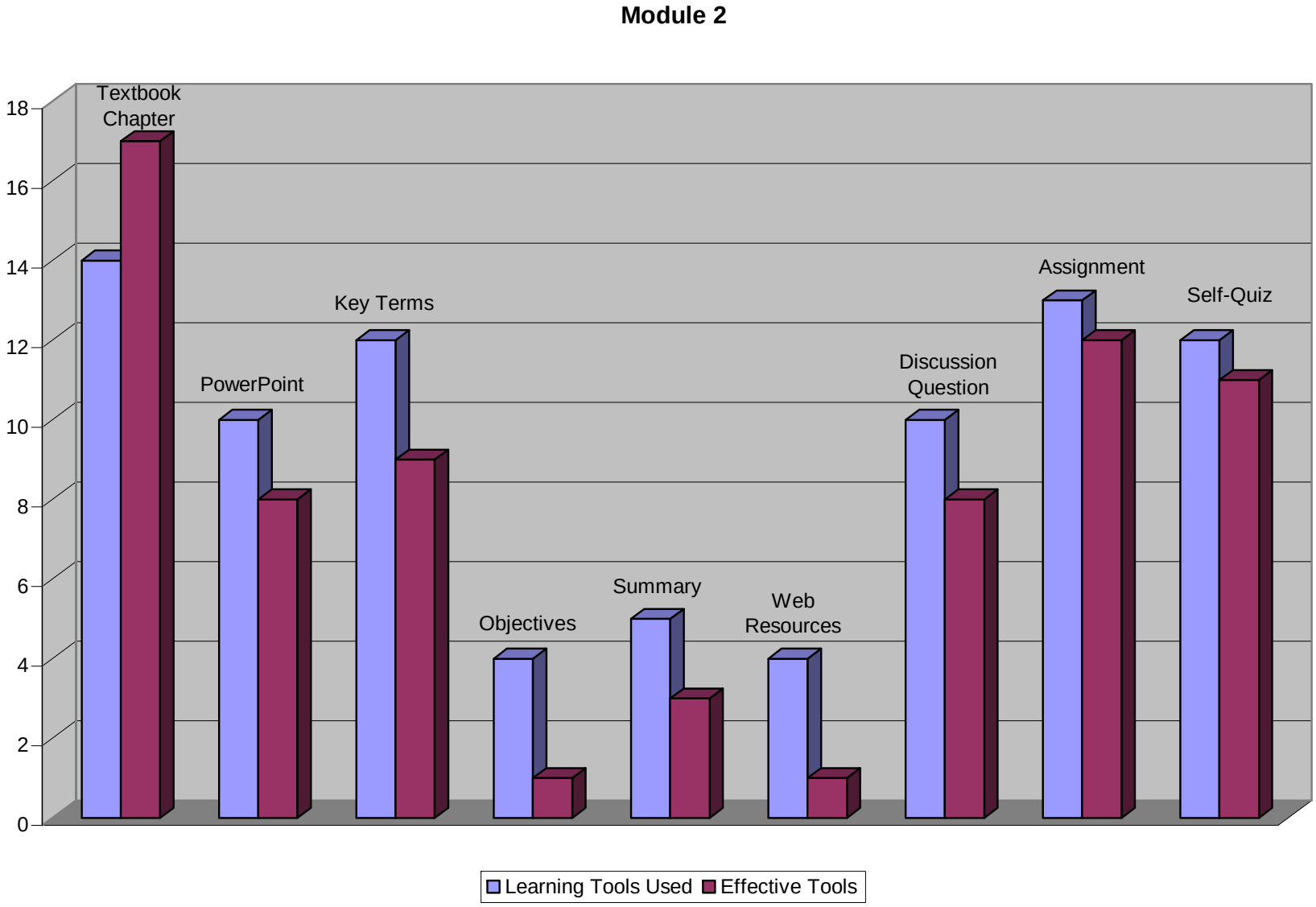
16
Learning Tool Used
Effective Tools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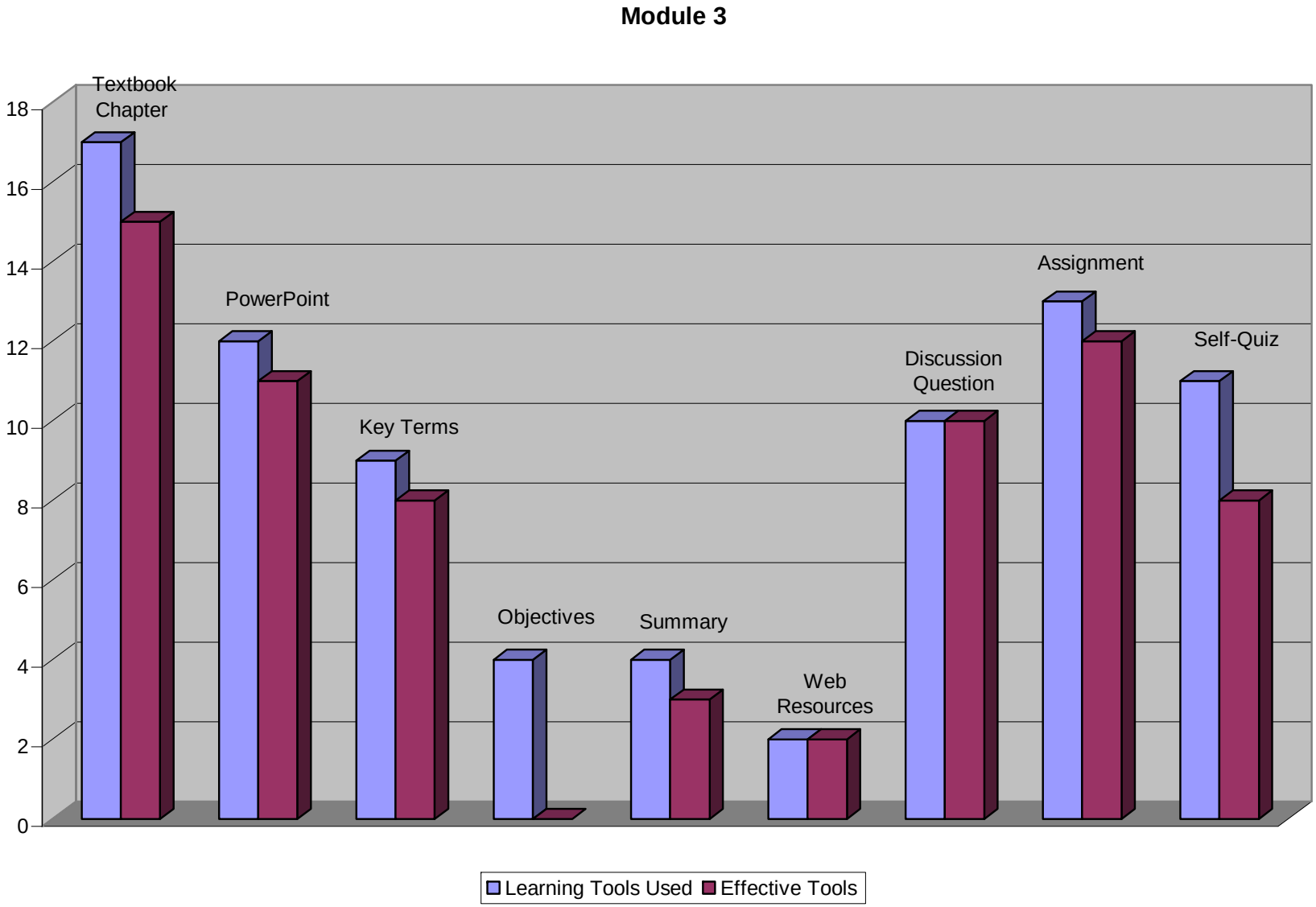
Key Terms
Objectives
Summary
Web Resources
Discussion Question
Assignment
Self-Quiz
Learning Tools Used
Effective Tools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Key Terms
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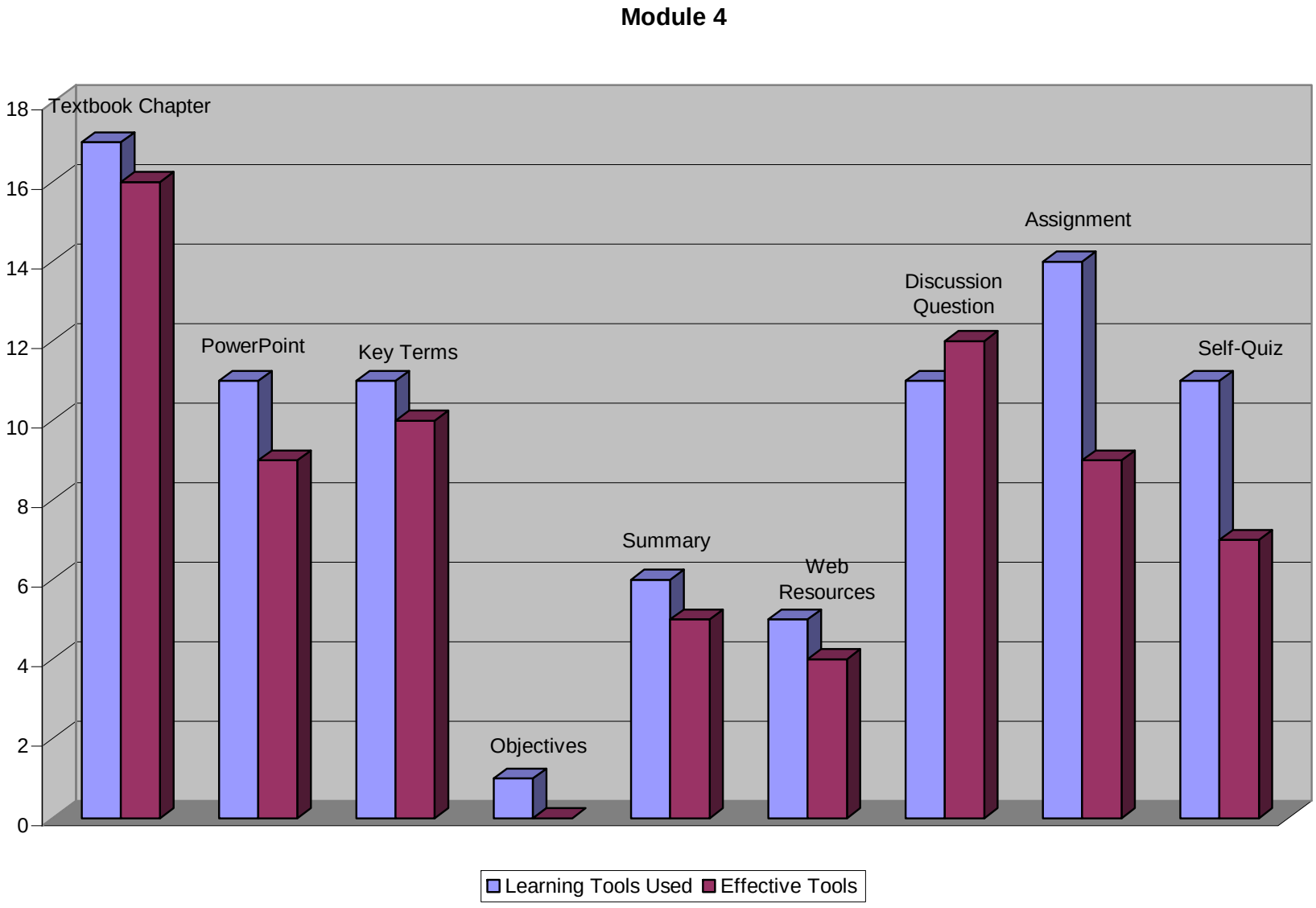
Summary
Web Resources
Discussion Question
Assignment
Self-Quiz
Learning Tools Used
Effective Tools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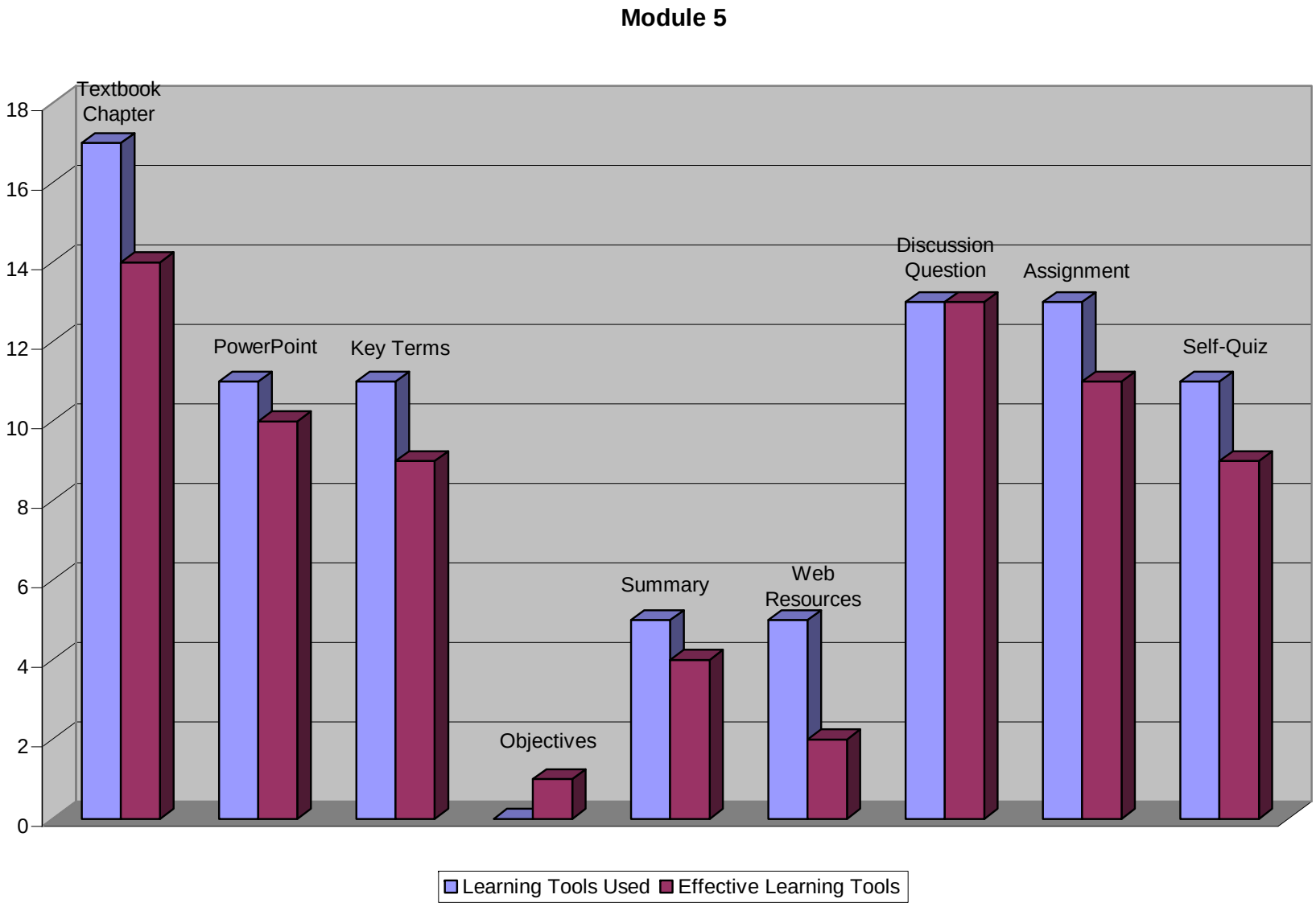
Objectives
Summary
Web Resources
Discussion Question
Assignment
Self-Quiz
Learning Tools Used
Effective Tools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PowerPoint
Key Terms
Objectives
Summary
Web Resources
Discussion Question
Assignment
Self-Quiz
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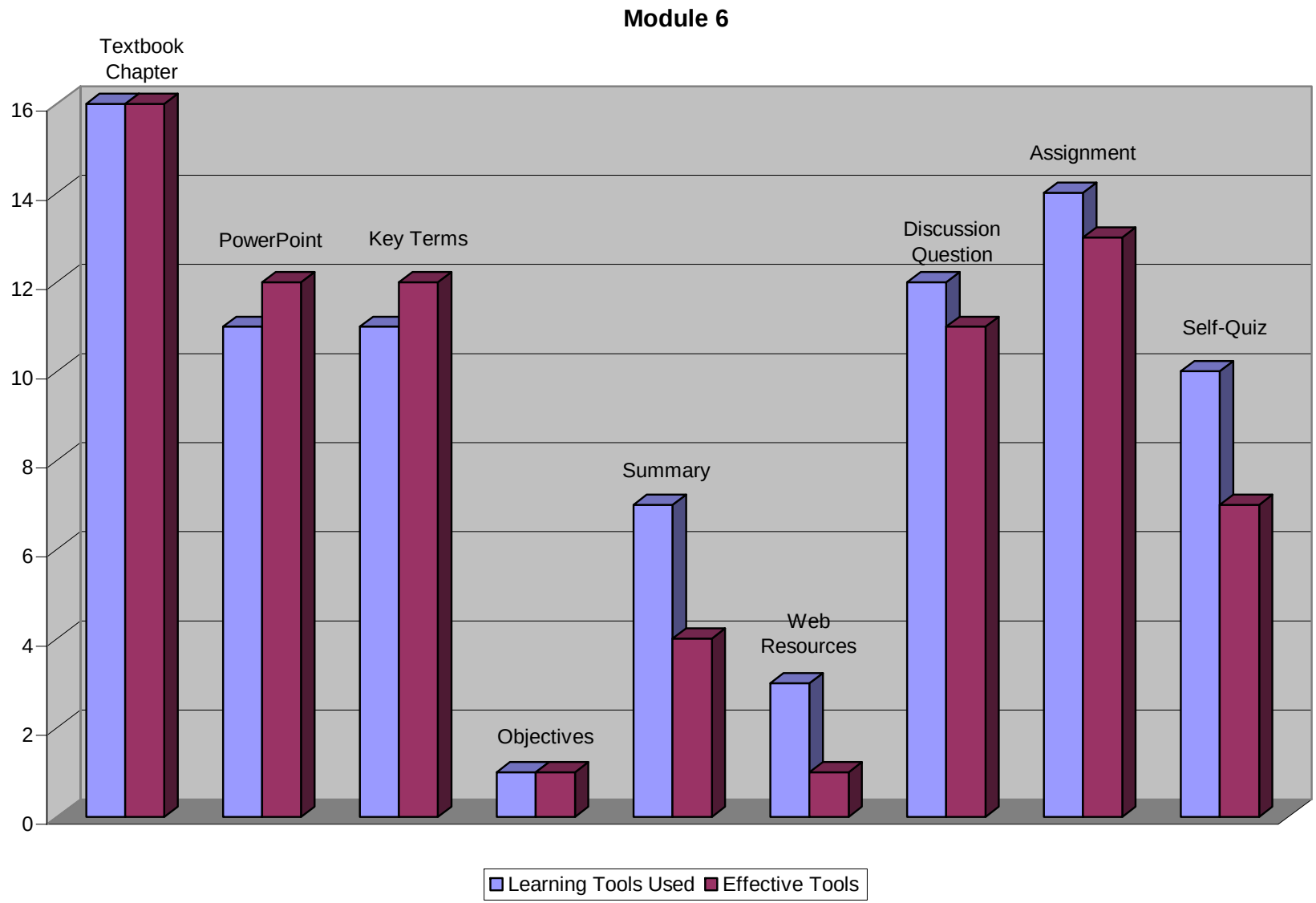
16
18
Learning Tools Used
Effective Learning Tools


Module 6
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PowerPoint
Key Terms
Objectives
Summary
Web Resources
Discussion Question
Assignment
Self-Quiz
16
14
12
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Learning Tools Used
Effective Tools

	Module 1-3 Discussions	Modules 1-3 Assignment	Number of tools used - Exam 1	Exam 1	Module 4-6 Discussion	Modules 4-6 Assignment	Number of tools used - Exam 2	Exam 2	Difference between Exam 1 and 2 Scores	Difference between number of tools used
									Positive indicates lower Exam 2 score	*Positive indicates lower number of tools used for Exam 2*
Student 1	60	57	4	14	60	39	5	13	1	-1
Student 2	60	58	6	25	60	60	6	26	-1	0
Student 3	60	59	3	19	60	58	4	24	-5	-1
Student 4	60	49	6	31	60	44	5	26	5	1
Student 5	50	54	7	19	60	52	5	14	5	2
Student 6	40	55	8	27	50	59	4	26	1	4
Student 7	40	58	8	24	30	32	4	17	7	4
Student 8	40	55	8	29	60	60	8	15	14	0
Student 9	60	57	4	26	60	59	4	25	1	0
Student 10	30	33	6	13	0	39	5	22	-9	1
Student 11	30	60	7	34	20	20	6	27	7	1
Student 12	60	60	6	32	60	60	6	39	-7	0

	Module 1-3 Discussions	Modules 1-3 Assignment	Number of tools used - Exam 1	Exam 1	Module 4-6 Discussion	Modules 4-6 Assignment	Number of tools used - Exam 2	Exam 2
Average scores:	49	55	6	24	48	49	5	23
Median scores:	55	57	6	25.5	60	55	5	24.5
High score:	60	60	8	34	60	60	8	39
Low score:	30	33	3	13	0	20	4	13

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