

## **CLASS.**

### **A Collaborative Lesson-planning And Search System**

#### **Purpose**

The purpose of this project is to enhance student learning through

- (1) growing an online community of educators who join forces in developing high-quality learning activities and selecting the best materials for these activities and
- (2) developing a supporting infrastructure that consists of
  - (2.1) a system that integrates lesson planning, search for materials, and packaging materials into enticing learning modules and
  - (2.2) collections accessed by this system and enriched by use.

It is the synergy between these two components that drives the project: Educators are empowered by the tool and feedback from educators' use will lead to improvements in the tool.

The application domain of the project is Holocaust and Tolerance Education with a focus on the collections of the USC Shoah Foundation Institute for Visual History and Education and of the United States Holocaust Memorial Museum. While this is an important domain in and of itself, the general idea and the system being developed can be applied to any domain with the potential of enhancing students' learning across all subjects.

The project is furthermore conceived as a demonstration of the digital library of the future, a library that offers both materials and tools for processing these materials and an environment where users collaborate in both using and contributing content.

#### **Overview**

##### **1 Growing an online community of educators**

This will be accomplished through a series of workshops held around the country which will introduce educators to collaborative lesson planning supported by access to materials. The workshops will cover

- Principles of Holocaust and tolerance education
- Systematic lesson planning using the tool (2.1), initially the prototype developed at the University of Maryland as part of the MALACH project.
- Working in teams across disciplines and synergy in collaboration between teachers and school library media specialists.
- The wealth of materials available at the USC Shoah Foundation Institute and the US Holocaust Memorial Museum collections, as enriched by educator's material appraisals, and effectively searching these materials.
- Appraisal of materials for educational use such that the results can be used by others .
- Synergy between lesson planning and searching for materials
- Reusing lesson plans or modules developed by others and collaboration at a distance

A typical workshop would consist of 10 – 12 participants in three teams , each team consisting of 2 – 3 teachers and 1 school library media specialist from the same school. The teachers on the team will come from history / social studies and from English.. Each teacher will develop a lesson plan,

working with the school library media specialist on finding materials and working with other teachers to share ideas.

The workshops would be presented / facilitated by staff from the University of Maryland, the USC Shoah Foundation Institute, as well as eminent Holocaust educators from the region where the workshop is held. We would also like to get the US Holocaust Memorial Museum involved

## 2 Developing the supporting infrastructure

### 2.1 Developing a pilot software tool

First we propose developing a **system that integrates lesson planning, search for materials, and packaging materials into enticing learning modules** based on a prototype developed as part of the MALACH project at the University of Maryland. The system will demonstrate the digital library of the future, which will, to borrow from the DELOS vision, "become the universal knowledge repositories and communication conduits, common vehicles by which everyone will access, analyze, evaluate, enhance, and exchange all forms of information." Digital library systems will be user-centric rather than application-centric, provide functionality that supports users' work and daily activities, support user-to-user communication and collaboration, and manage ontologies to undergird users' individual work and promote common understanding as a necessary basis for successful collaboration.

The functionality of the proposed system is shown in Table 1

**Table 1. The design of a lesson planning system. Overview**

1	A knowledge organization infrastructure that fosters development of shared understandings among users and supports organization of materials.
2	Mediated access to digital libraries containing many types of materials with powerful, ontology-enhanced search.
3	Intellectual property rights and access management.
4	A collaborative authoring system with annotation facility that will facilitate packaging materials into enticing learning modules.
5	Communication functionality.
6	Integration with the teachers total work environment, including keeping a record of learner background and educational requirements analysis and of lesson plan evaluation.
7	Interaction history. Customization and personalization, adaptive system.
8	An interface that provides easy access to all this functionality.
9	Extensibility.

The system includes

- an extensible **lesson planning template** that facilitates sharing and reuse of lesson plans and lesson components;
- a **query template** with slots that capture search criteria important to teachers such as relationships to local and state-wide educational standards, age range, vocabulary words, and suitability for use with a book such as Anne Frank's Diary;

- a **materials appraisal template** that mirrors the query template so that teachers' shared appraisals enrich material catalogs in teacher-oriented ways;
- access to domain-specific thesaurus, such as the Shoah Foundation Institute thesaurus;
- access to a database of state education standards across the US which can be augmented by adding local standards.

Over time, this will result in a database built by teachers for teachers.

The default layout of the screen shows the lesson planning window on the left side and the query, result display, and material appraisal windows on the right side, with the inactive windows minimized. This layout worked very well in a teacher workshop in August 2007.

## **2.2 Providing access to collections enriched by use**

The system (2.1) will mediate access to important collections, initially the USC Shoah Foundation Institute's Visual History Archive of 52,000 videotaped Holocaust survivor testimonies and the very rich Web site of the US Holocaust Memorial Museum. Simultaneously, the lesson plans and modules that teachers develop as well as the material appraisals will be captured in a database (to the extent that teachers agree to share them) and made searchable along with the external materials. When searching an external database, teachers can specify criteria captured in appraisals, and the search will be done as follows: First, a subject search is conducted on the external database. Then each of the results is checked against the database of material appraisals; if it is found there, the additional criteria are checked; if they are met, the result is moved to the top group of results, if the criteria are not met, the result is moved to the bottom of the list. Results that had no appraisal are in the middle of the result list.

This part of the project will promote the use of the digital assets of the partner institutions.

In the system development proposal, I will include support for the following capabilities

(1) Searching a subset of the collection that uses old cataloging. This is easier to implement and easier to learn than searching new cataloging.

(2) Searching testimonies that use new cataloging as part of the tool. This search would be similar to the VHA interface. At the same time, using the two search modalities together should be as seamless as possible

(3) Accessing the VHA from within the tool through a gateway so that searching the VHA is an integral part of the tool. Use of that functionality requires Internet 2 access.

(4) A capability for editing testimonies, in particular giving the user the ability to define clips by indicating begin time and end time, regardless whether the testimony was cataloged by the old method or the new method.

(1) and (2) together would allow the deployment of a free-standing application for the workshops.

In the proposal for holding the workshop, I will include the idea that we would work with education departments in the universities that are getting Internet 2 access to the VHA in sponsoring workshops for educators in the local area.

## More detail on CLAS

**Table 2. The design of a lesson planning system. Detail**

- 1 A knowledge organization infrastructure** that fosters development of shared understandings among users and supports organization of materials. This includes
  - 1.1 A lesson plan template that lays out the components of a lesson plan.
  - 1.2 A query template to assist in formulating queries for learning objects and other materials.
  - 1.3 A material appraisal form using the same structure as the query template.
  - 1.5 A hierarchy of educational standards from several jurisdictions.
  - 1.4 A thesaurus / classification of topics in each accessed database domain that is useful for searching and for giving teachers content ideas.
- 2 Mediated access to digital libraries** containing many types of materials with **powerful, ontology-enhanced search**, including the following components:
  - 2.1 A library of the lesson plans, lesson modules, and material appraisal records created by teachers. This would have controlled access, so that access to any given item could be limited just to the teacher who created it, or to teachers in the same school, etc.
  - 2.2 Access to other libraries of learning objects, such as XXX and to digital versions of textbooks, with each section keyed to educational standards where possible.
  - 2.3 Access to many specialized digital libraries or databases. For example, in the prototype we provided access to a huge archive of videotaped Holocaust survivor testimonies, with testimony passages indexed using a large specialized thesaurus.
  - 2.4 Intelligent Web search.
  - 2.5 A database of all texts generated in communications among teachers (with appropriate access restrictions).
  - 2.6 Ability to consider annotations in search.
  - 2.7 Notification when new materials of interest to the user are added to a digital library or database on the user's 'watch list'. This may include adaptation (see 7.3) and a social recommender system.
  - 2.8 Notification when there is a change in elements of the environments that affect the user's work. For example, if there is a change in an educational standard mentioned in a lesson plan, the teacher would be notified.
  - 2.9 Quick access to a description of the background knowledge students in a given class (a) are expected to possess and (b) actually do possess (see also 6.6).
- 3 Intellectual property rights and access management**

Determine access rights and the need for obtaining permission for the use of both external and internal materials. This is quite complex since access right is often a function of the individual item (including the characteristics of its author) and the individual user and her characteristics (such a working in a specific school).
- 4 A collaborative authoring system with annotation facility**
  - 4.1 Support for authoring through the lesson plan template and the learning object assessment template.
  - 4.2 Support determining the sequence of lesson plan elements and pacing the lesson plan, including keeping track of the total time used.
  - 4.3 Intelligent copy and paste from any source with retention of a link/reference to the source.
  - 4.4 Ability to assess and annotate external materials.
  - 4.5 Creation of audiovisual objects to be used in the classroom or for long-distance learning using a combination of objects found with the possibility of easy editing, for example, editing and

sequencing a series of video clips.

- 4.6 Support for creating interactive materials.
- 4.7 Support for creating materials for distance learning.
- 4.8 Support for easy sharing and reuse of materials with version control and coherent display of differences among multiple versions.
- 4.9 Support for simultaneous editing using a shared whiteboard.

## **5 Communication functionality**

- 5.1 Integrated with regular email to quickly email a lesson plan or any other object from any of the sources.
- 5.2 Integrated with instant messaging with file attach to ask other teachers quick questions.
- 5.3 Support for telephone and video conferencing among teachers with a shared whiteboard.

## **6 Integration with the teachers total work environment, including lesson plan evaluation (this pushes the boundary)**

- 6.1 Associate lesson plans with time slots for a given class.
- 6.2 Prepare requests for permission to use materials as needed (see also 3).
- 6.3 Have material, such as quizzes, prepared in sufficient number or arrange for electronic administration.
- 6.4 Order equipment needed as specified in the lesson plan.
- 6.5 Notify the school library media specialist of assignments that require the use of the school library media center.
- 6.6 Have a function for recording grades and importing detailed standardized test scores (broken down by educational standard). It is then possible to determine how well different elements of a lesson plan worked in each class or even for a certain type of student. It is also possible to create student profiles identifying strengths and weaknesses and identifying areas requiring remedial work. The system could then be used to find materials that could help the student.

## **7 Interaction history. Customization and personalization, adaptive system**

- 7.1 Keep a complete history of all interactions the user has with the system, including queries, assessments, annotations etc. so that the user can reconstruct what she was doing at any time and can also retrieve actions or results that she remembers by time.
- 7.2 Allow the user to set certain parameters that govern system behavior, for example the word processor used wherever text is entered (customization).
- 7.3 Keep a user profile, partly entered directly (for example, the teacher's subjects, years of experience, and school), partly learned from the user interaction history. The system then uses this profile to adapt its behavior. For example, it presents the educational standards and vocabulary word lists in force in the teacher's school or required in the text book the teacher uses. Result assessments can be used for standard relevance feedback.

## **8 An interface that provides easy access to all this functionality**

## **9 Extensibility**

- 9.1 Allow for easy plug-in of or seamless data exchange with third-party tools. For example, QMind, Inspiration, and other programs allow for alternative approaches to lesson planning [6]. Allow sharing and annotation of the created files as well
- 9.2 Allow a group of teachers to define their own lesson plan and assessment templates, either from scratch or by editing the system-provided templates.

Some of the functionality described in this design has been implemented in a prototype which is presented through a number of screen shots in the remainder of Part 2. We tested the prototype in a teacher workshop on planning lessons in tolerance and Holocaust education. The teachers' response was very positive; they liked the integrated functionality.

The prototype provides access to only one digital library, a subset of the Visual History Archive of 52,000 videotaped two-to-three hour interviews with Holocaust survivors created by the University of Southern California (USC) Shoah Foundation Institute for Visual History and Education. This subset has been painstakingly cataloged: Catalogers divided each interview into topically coherent segments (usually 2 – 5 minutes), wrote a three-sentence summary, and assigned subject and geographical keywords from the Institutes thesaurus as well as names of persons mentioned. For an example, see Figure 7a. This display shows the 'scratchpad', the cataloger's detailed notes taken in preparation for writing the summary but quite useful in themselves. The system also has an option for displaying a transcript produced by automatic speech recognition (ASR), but the quality of ASR is not quite at the point needed to produce text that can be easily read (the word error rate is about 25%). For experimental purposes, we also show additional keywords that were produced by an automatic classifier working from ASR text and trained on a different subset of the Archive.

The remainder of this section gives a walk-through of the system using the screen shots in Figures 1 – 9.

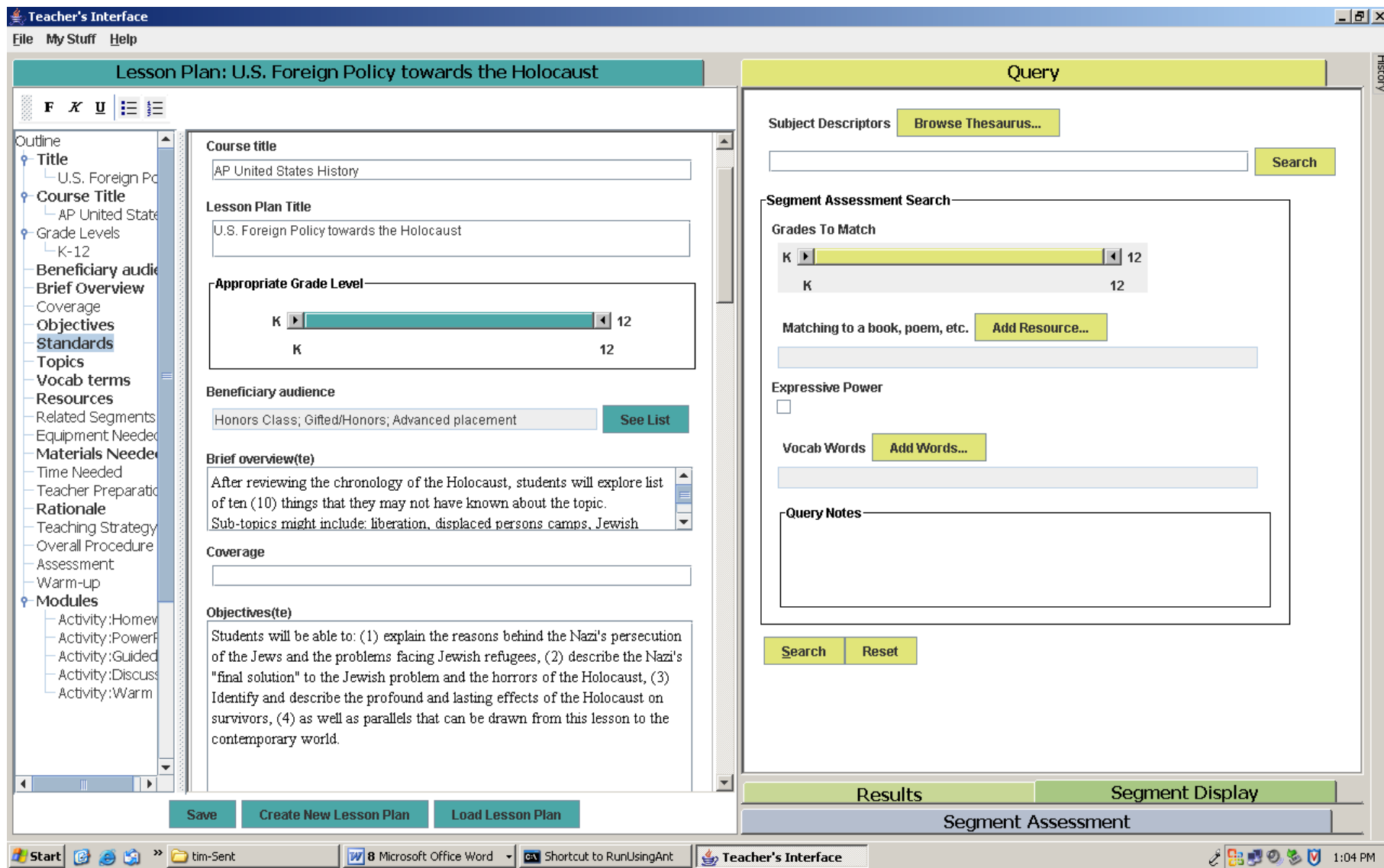


Figure 1. Opening screen for creating a lesson plan

This is the opening screen for creating a lesson plan, with the lesson plan on the left site and a search (Query) screen on the right

(integration of authoring and searching). The teacher starts filling in some elements of the lesson plan template



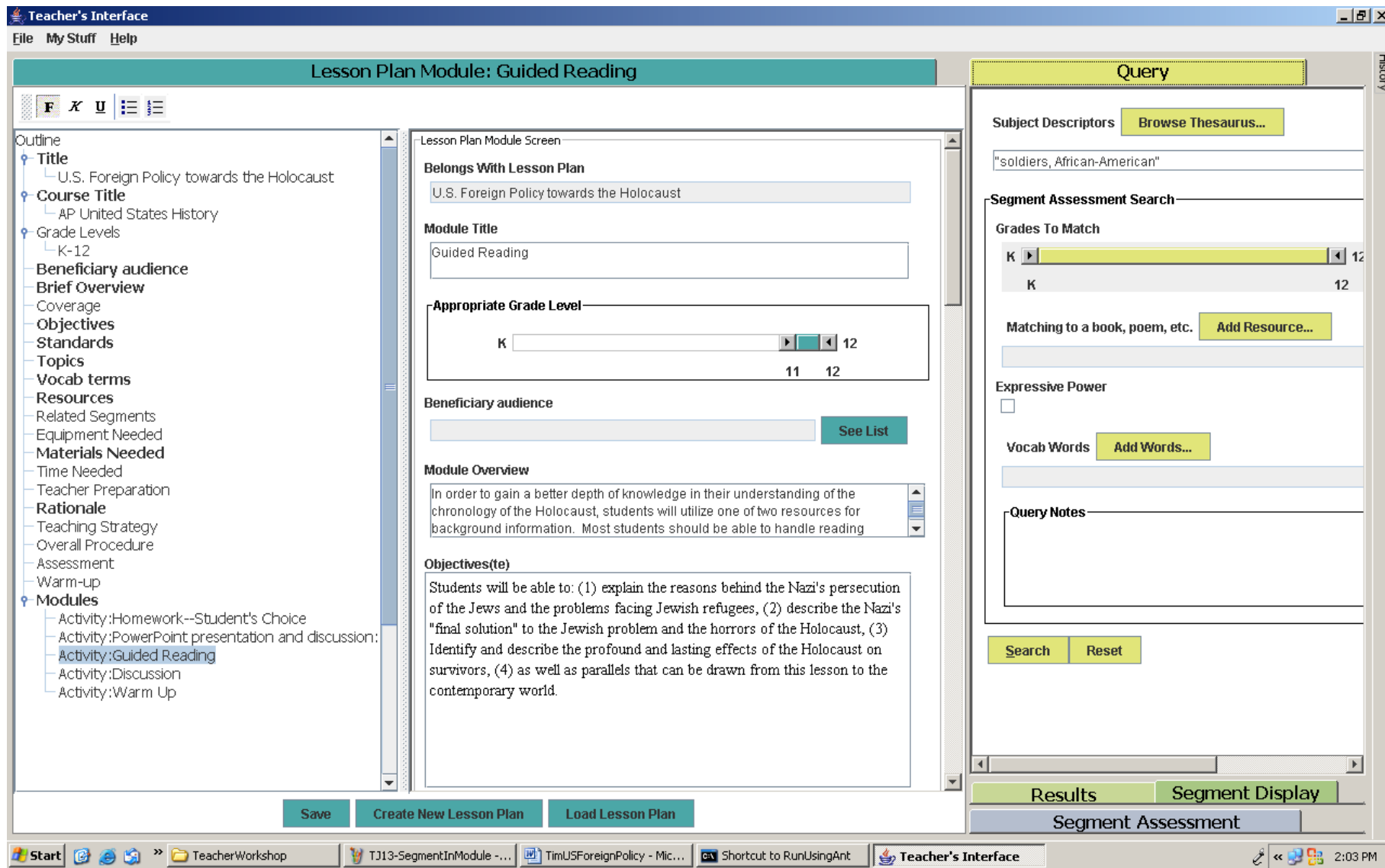


Figure 2. Lesson plan outline

The fully expanded outline for a lesson plan (the lesson plan template). This always keeps the entire structure before the user so

that the user knows where the specific the piece she is working (in the example a lesson plan module) fits.

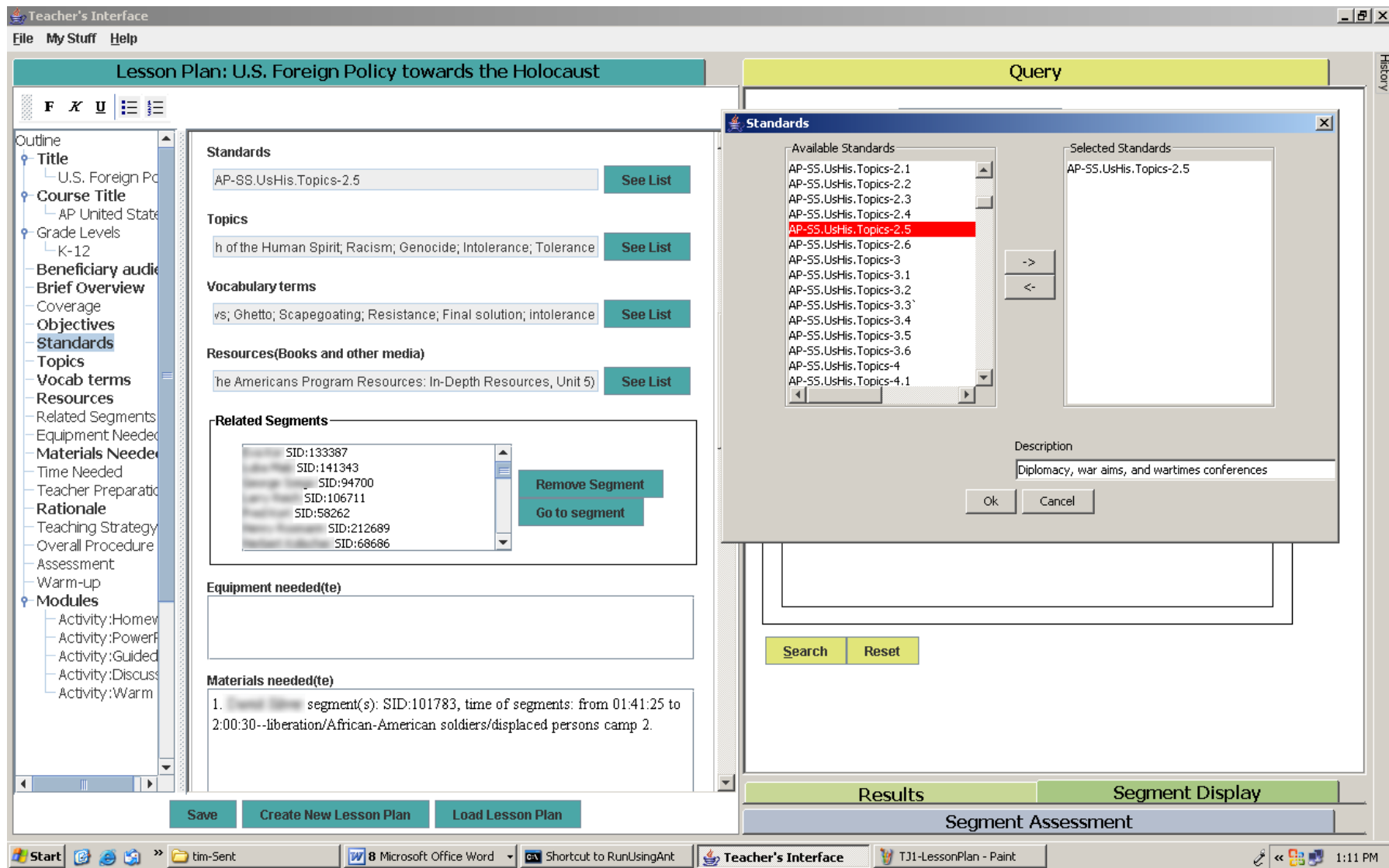
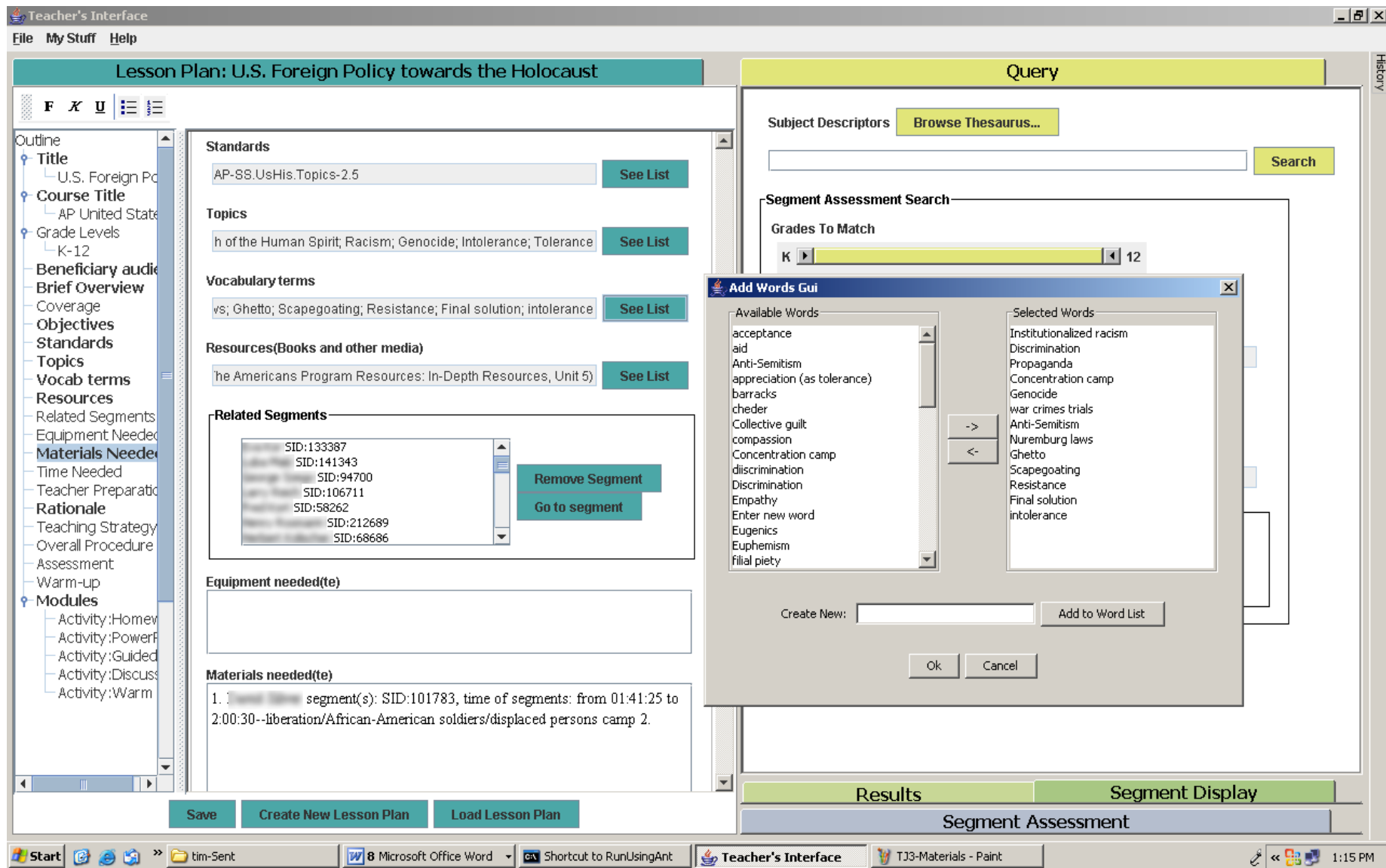


Figure 3. Selection of applicable standards

A display of standards (customized to show the standards applicable in the teacher's school system). The teacher selects the specific standards applicable to the lesson or module at hand. The fully developed system will show standard texts and, on

mouse over, the textual elaboration of the standard. Teachers will be able to include standards in a query formulation. The teacher may also wish to annotate the standards, for his own use or to share with others (not implemented in the prototype).



**Figure 4. Selection of applicable vocabulary words**

The system displays first new vocabulary words that are prescribed by the standards that apply to the larger unit of which the lesson plan is part and/or by the textbook.

used in the class, and then previously covered vocabulary words that might need reinforcing. The teacher can add additional vocabulary words to this list..

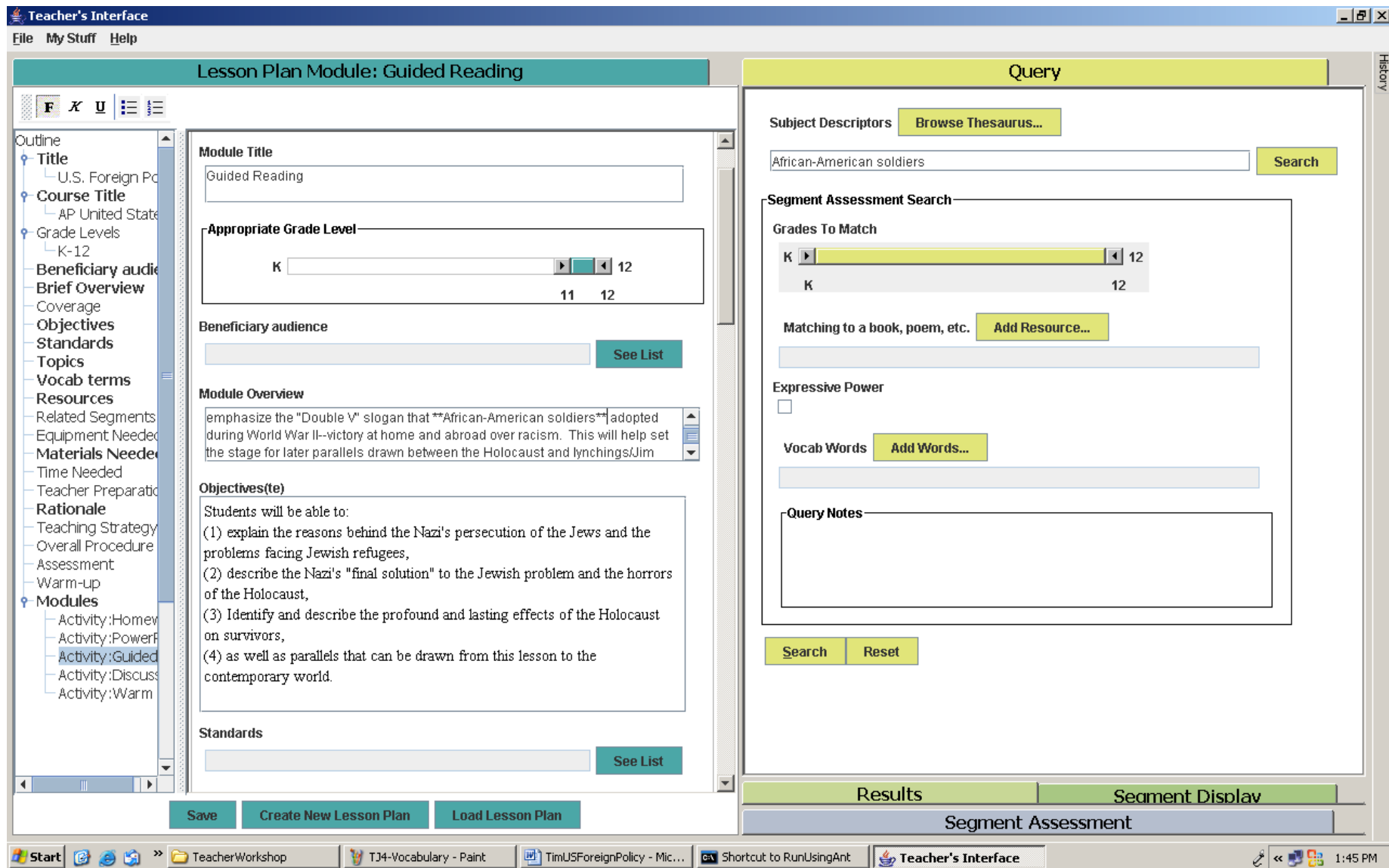


Figure 5. Query formulation from a theme in the lesson planning module

The teacher formulates a query using a theme from a lesson module, demonstrating the seamless integration of lesson planning and search. There is no need for leaving

one system and entering another.

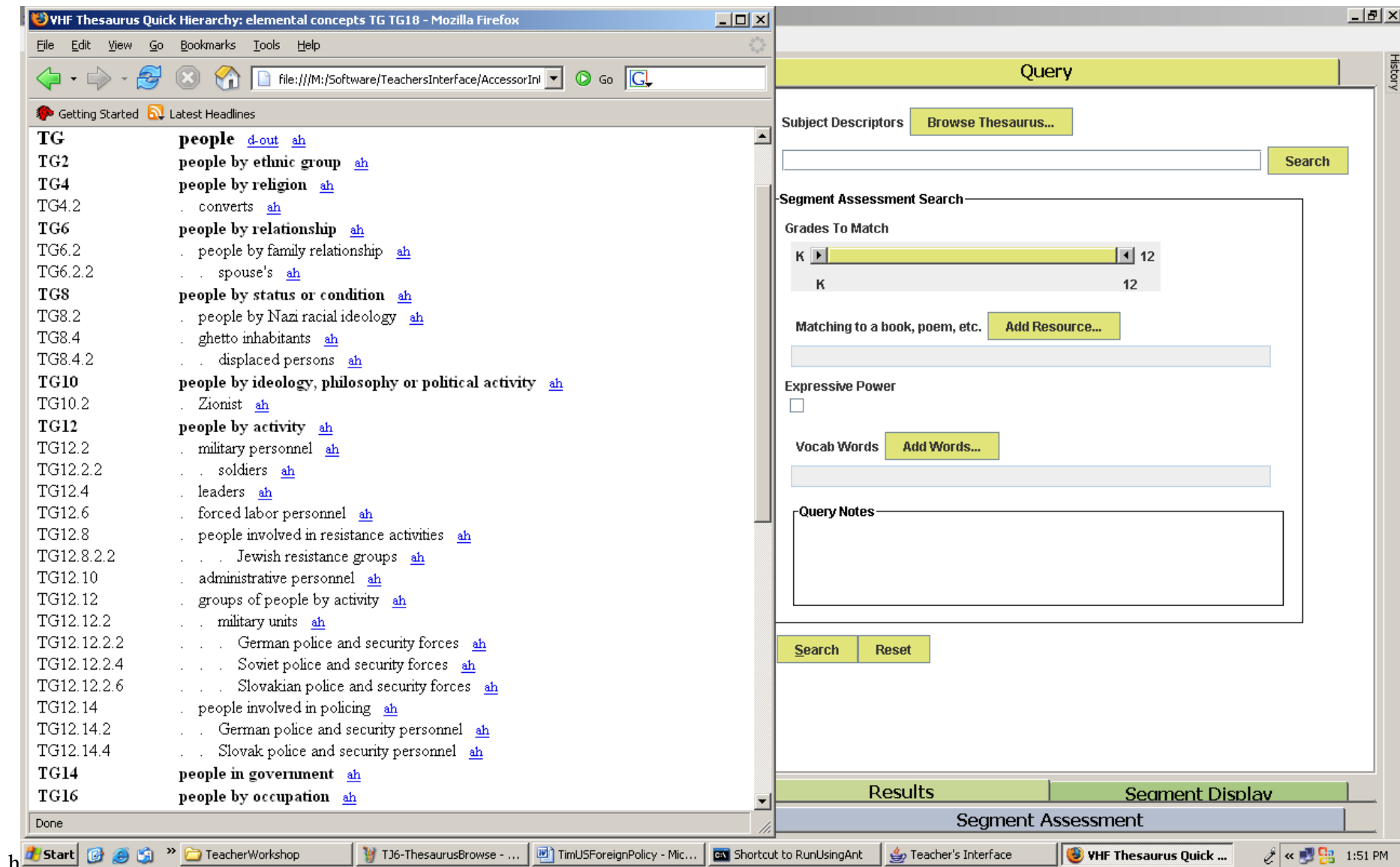
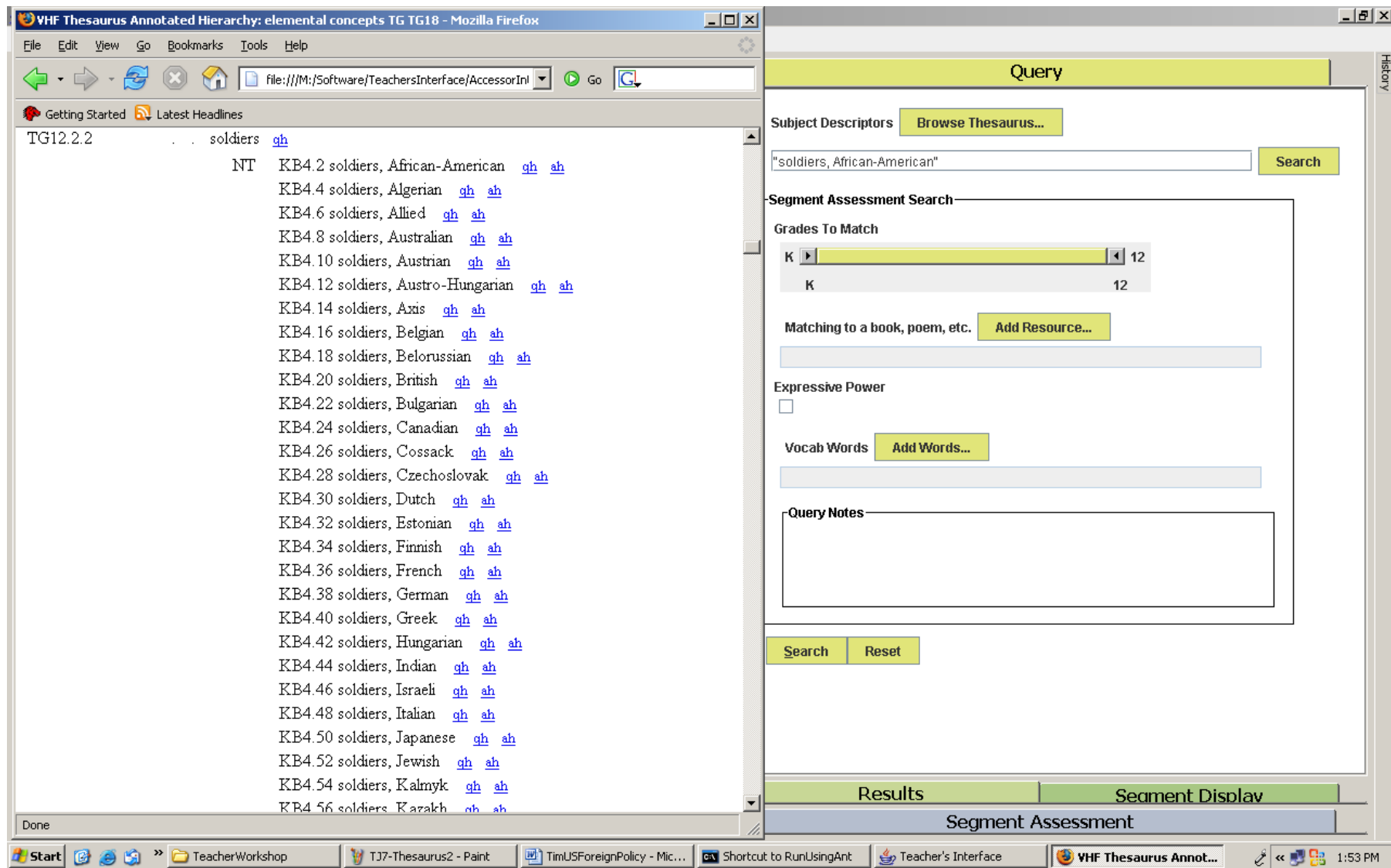


Figure 6a. Browse the thesaurus

The teacher browses the thesaurus for the collection being searched

using the 'Quick Hierarchy' display and finds the descriptor *soldier*.



**Figure 6b. Descriptor found in detailed information for *soldiers***

Turning to the 'Annotated Hierarchy', he finds through cross-references the descriptor *soldiers, African-American* and puts it in the query box, replacing the free-text query with a descriptor found

through browsing the thesaurus. The teacher could specify the query further by grade level and other elements of the query template, but this topic is so specific that this does not seem necessary.

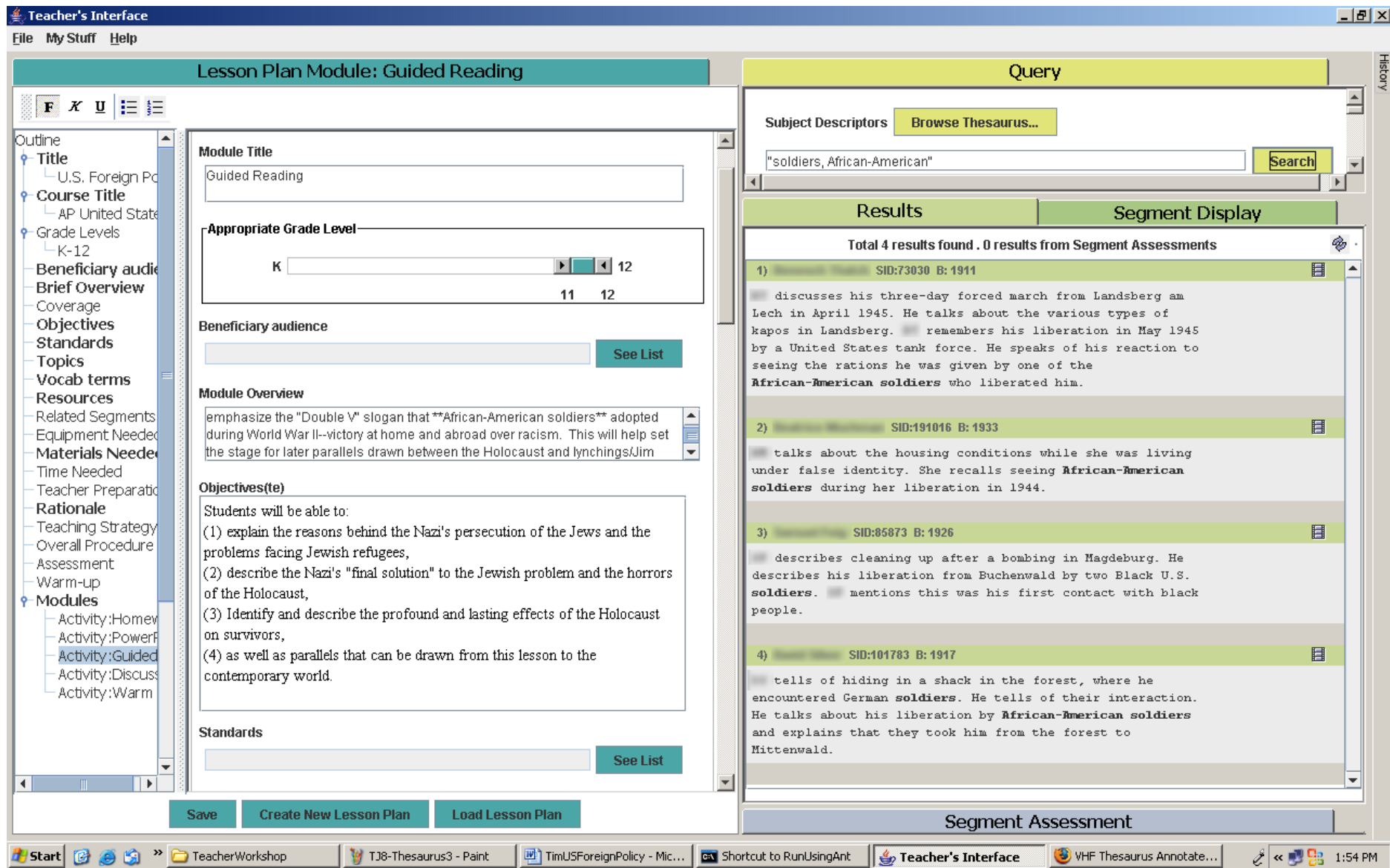


Figure 7. Display of results

The system then displays the results, a list of interview segments,

giving for each segment a manually created summary



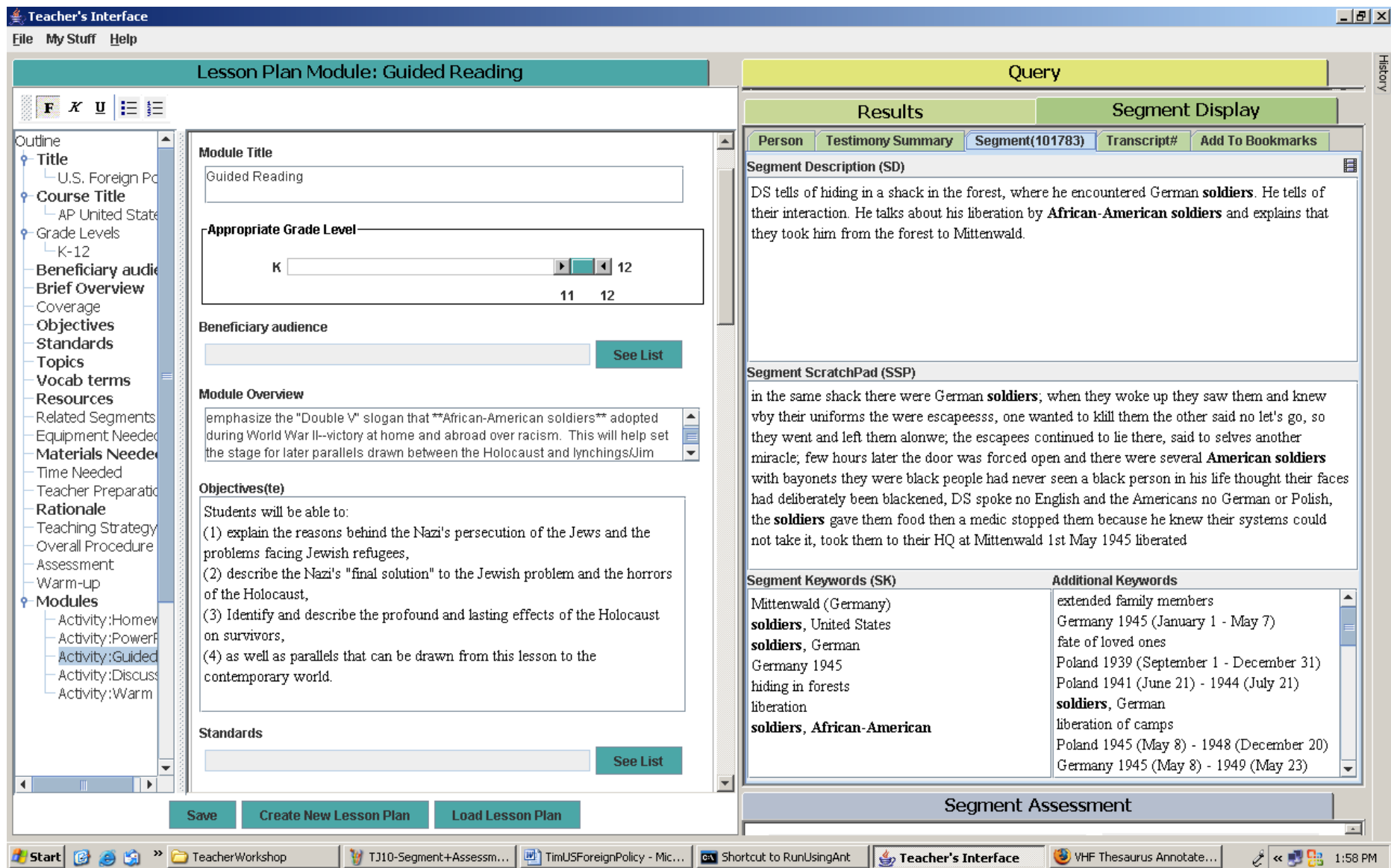


Figure 8a. Segment Display. Detailed information about the segment

The user can look at detailed information about a segment



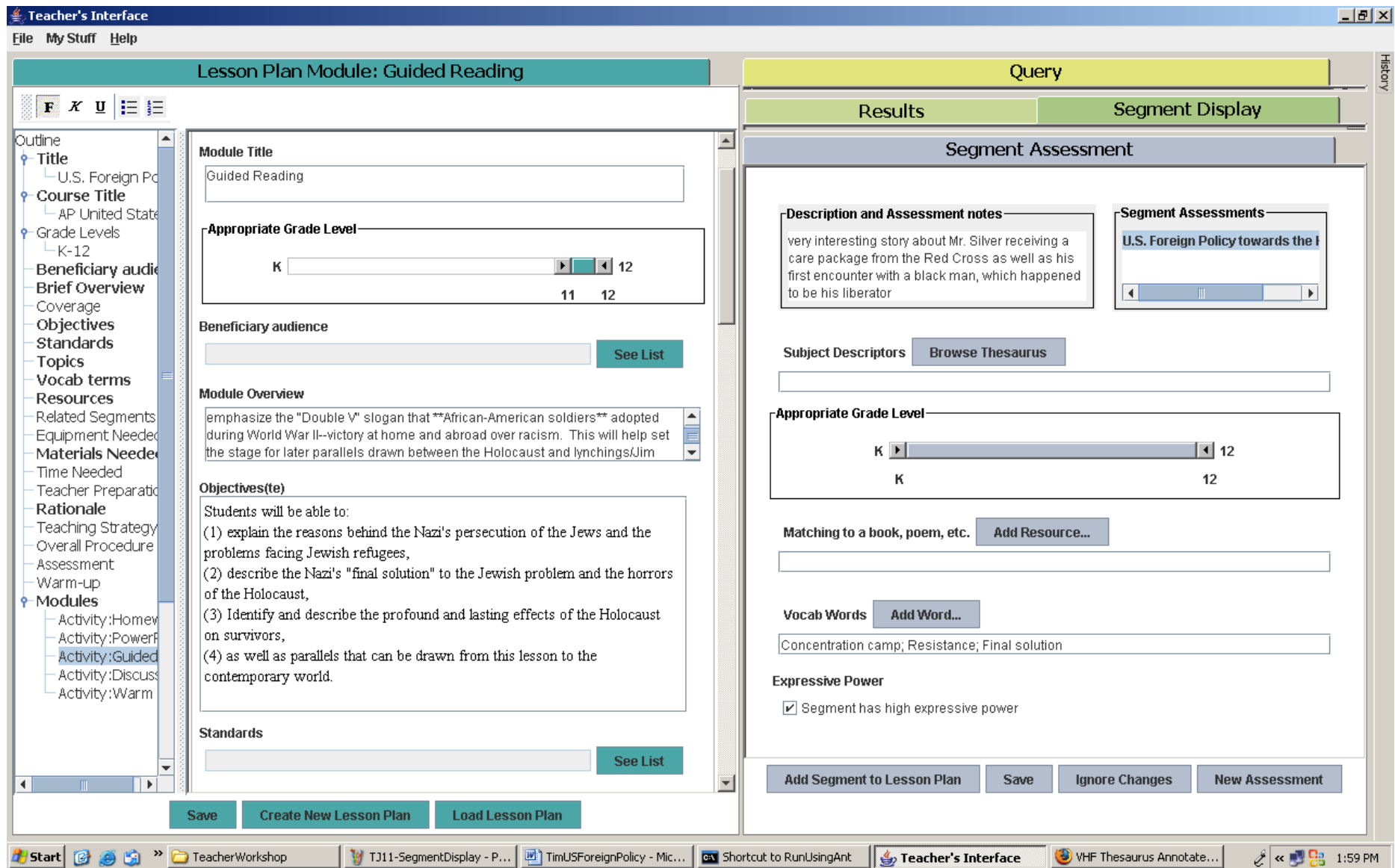


Figure 8b. Segment Assessment. The full form

The teacher assesses the value of that segment for use in the classroom,

particularly for use in the lesson or lesson module shown on the right

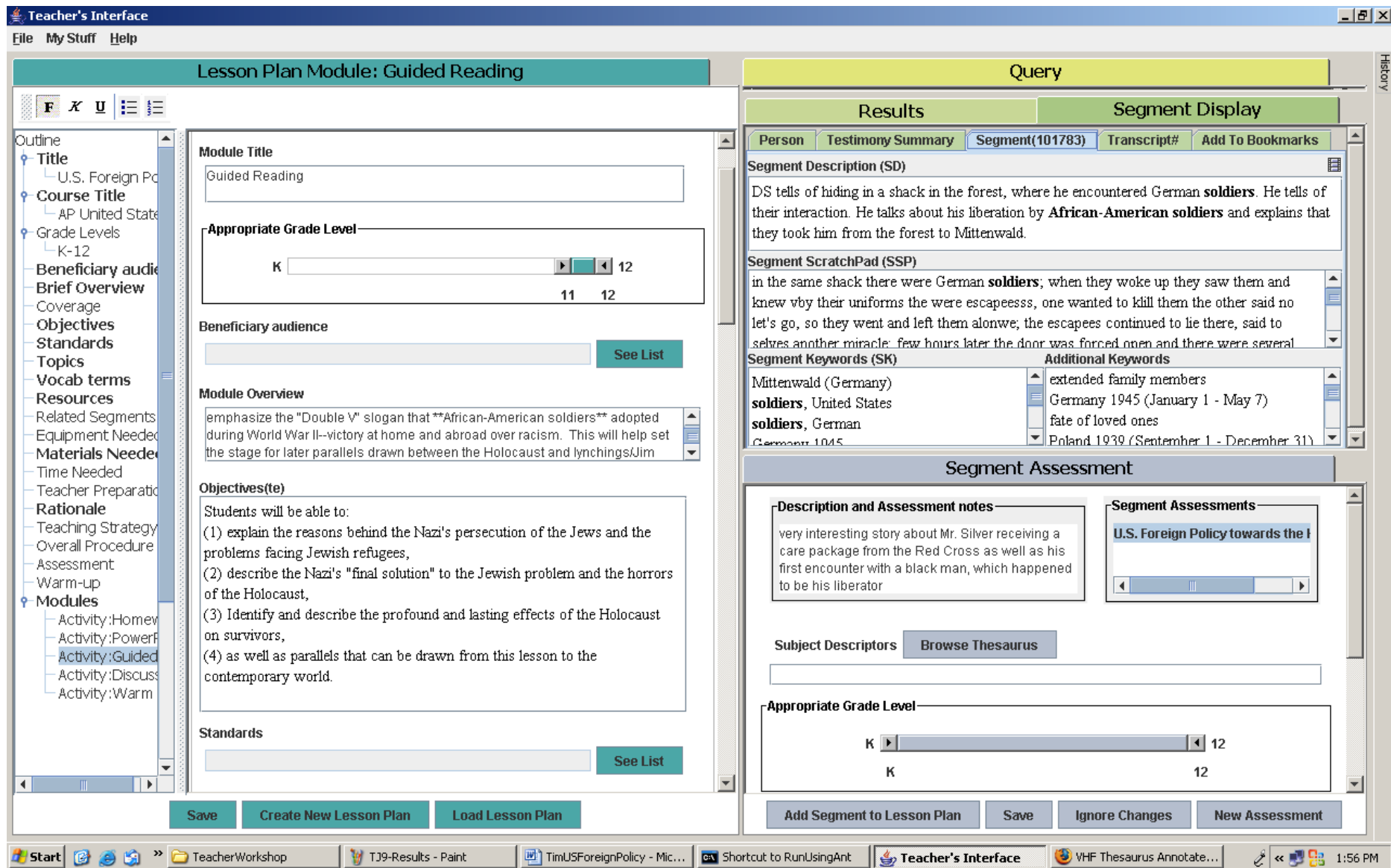
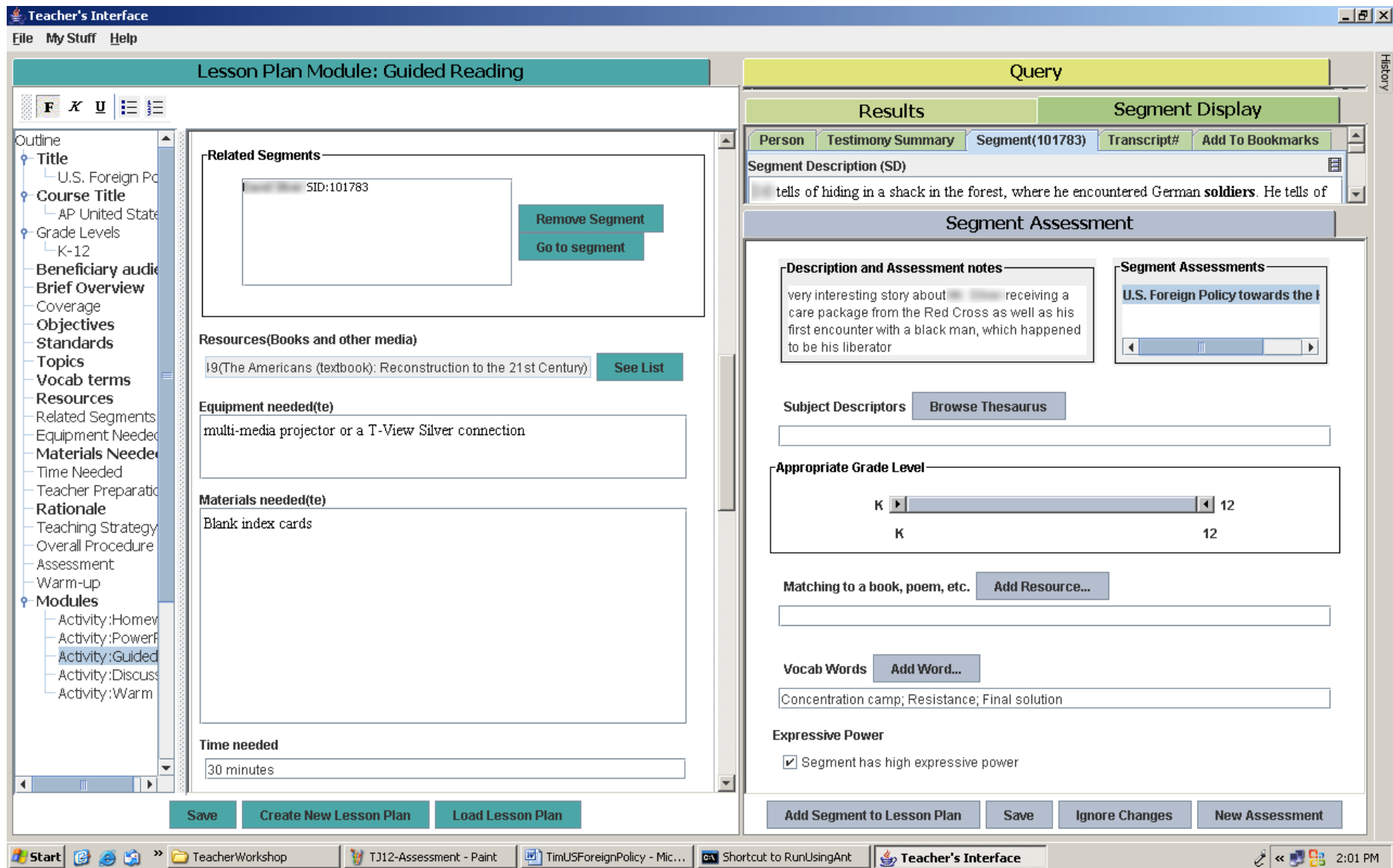


Figure8c. Segment Display and Segment Assessment sharing the screen

The segment detail window and the assessment window can also be

shown simultaneously, requiring scrolling in each



**Figure 9. Interview segment added to lesson plan module**

Once the teacher has completed the segment assessment, she can add

the segment to the list of lesson materials with a simple click

This completes the walk-through. The following notes highlight some additional features. The templates shown in the screen shots are prototype versions. They need further elaboration. For example, both the query template and the assessment templates need a slot for educational standards because teachers want to search for materials that support a standard. The segment assessment template has the same structure as the query template; the criteria by which teachers want to find materials should be the criteria applied in assessment. Again, the common assessment format makes sharing easy.

Another example of consistency in the interface is that the teacher can display the vocabulary box not only in the lesson plan but in the same way in query formulation and in the assessment template. There is an analogous feature for displaying specific books or book sections to which a lesson plan or a segment relates. A teacher may also wish to annotate the standards, vocabulary words, or books, for his own use or to share with others; this feature is not yet implemented.

A segment can be assessed multiple times by different teachers or by the same teacher for different lesson plans. Search is possible by any combination of criteria from the segment description provided by the Visual History Archive (and later automatically transcribed text) and from all segment assessments. A teacher can then look at all the assessments of a segment found. A teacher can edit an assessment she found; the edited version will be saved as a new assessment under the editing teacher's name linked to the lesson plan the teacher is working on. The system maintains a history that shows how one segment assessment evolved from another. In a complete system a teacher could also annotate a segment assessment (which is different from revising it).

While the teacher is searching for and assessing segments (and other learning materials in a more complete system), she will also get ideas for new activities or other elements of the lesson plan. The system fosters and facilitates the natural interaction between lesson planning and searching for learning materials.

When the teacher is done, the system produces a lesson plan in Word, which the teacher can then further edit. A later iteration will pull the segments the teacher marked for inclusion in the lesson plan and put them on a CD (now this has to be done by hand), and in the final version the teacher can produce an 'edited reel' consisting of interview passages selected and sequenced by the teacher.

The system described has the potential of stimulating collaboration among teachers. Teachers can find lesson plans, individual lesson modules (XXX) and material appraisals created by other teachers in a familiar format they can easily and quickly assimilate and modify. Teachers at the workshop indicated that while now they hardly collaborate on developing instructional materials because it is too time-consuming they might well collaborate if they had the support of a system like this.

In sum, a system like this promotes reuse of learning objects and frees teachers from a lot of drudgery (in particular the full version defined in Table 2), so teachers can spend more time in creative work preparing learning experiences adapted to the specific needs of their students.

## **References to some lesson planning software**

QMIND: E-Learning Storyboard & Rich Media Design Collaboration Software  
[www.qmind.com](http://www.qmind.com)

Inspiration Lesson Planning – Diagrams

[www.inspiration.com/productinfo/inspiration/using\\_insp/index.cfm?fuseaction=lessonplanning](http://www.inspiration.com/productinfo/inspiration/using_insp/index.cfm?fuseaction=lessonplanning)

Planit. Drag and drop lesson planner, resource organizer and presentation tool

[www.genealogic.com/index.php?id=planit](http://www.genealogic.com/index.php?id=planit)