Captions

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An Online Technical Vocabulary Reference Tool for Deaf Students

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AN ONLINE TECHNICAL VOCABULARY REFERENCE TOOL FOR DEAF STUDENTS

Presenter: RAYMOND GROSSHANS AND GERALD BERENT

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>> RAYMOND GROSSHANS: Good afternoon, everyone.

My name is Ray Grosshans.

I'm on the faculty here at NTID.

And have been for 26 years.

I'm presenting a project that I did this past year with my colleague, Jerry Berent, that grew out of an observed need in the classroom.

We'll give you sort after overview of how we've integrated technology here at NTID over the years and how some of these projects have persisted, so to speak.

Okay.

This project started -- the idea for this project started years ago when we were trying to come up with a better way to teach students specialized technical vocabulary, particularly for interpreting engineering drawings for blueprint reading.

And initially we tried simply assigning students readings from the text and from a glossary, and then administering matching-type quizzes.

What we found over the years is that the students did very poorly on these tests, and typically didn't master the vocabulary, although they were able to master the calculation and much of the interpretation required to understand the blueprint, they never really got a handle on the vocabulary.

So the next step -- then the next step in this project, and this was some years ago, I developed what I called the parts library, which was simply a collection of actual physical objects that I put on shelves and labeled and then, with terms corresponding to the vocabulary terms I wanted the students to master, and then created time

for them.

This is simple but effective.

We just took some shelving and set it up with tools, work pieces, different projects, and then labeled them with permanent paint so that the students could handle the parts, so that they could come into the lab with their vocabulary list and find a physical example of every part that -- or every term that was included in the vocabulary list.

That seemed to help, but we had limitations because of the time and space available for the students to come in and access that material.

So the next step, when PowerPoint first came on the market, I began developing crude sets of slides that students could access in the computer labs, and, of course, in the early '90s not every student had a computer available 24 hours a day as they do now.

So we began by creating individual slides using just standard Microsoft, you know, off-the-shelf icons and used those slides in lectures.

Here's an example of a very early slide.

Describing a process -- a machining process, and in this slide, we just included the term and a definition and a picture with some labels.

But, you know, again, there were limitations.

The students could only use these in the computer labs or I could use them to supplement lectures, but they weren't available, you know, around the clock as you might hope.

So the next step was to set up a computer carts throughout our teaching labs with these materials and similar materials available during the classes that the students could access on an as-needed basis.

They also were -- as more and more students came to own their own computers, we were able to give students, then, copies of these slides so that they could take -- you know, take it home and study them on their own time whenever they wanted.

But more recently, now that every student has a computer available, both in their dorm and virtually everyplace on campus, it became obvious that the next step was to try to put this up on the web somehow, so that we could include more terms with more detailed information and have it available to students around the clock.

And rather than have to manage a copy of it themselves by using the "my courses" program, which is the RIT classroom software, we're able to make it available for multiple courses, multiple sections, around the clock, so the students could access it both from home or anywhere they could get on through wireless in the classroom, so that the instructors could have it and then we began to expand the project to include other instructors.

Up until this time, this was something that I was doing on my own.

So a year ago, two years ago, we applied for a small grant to get some release time and a little bit of technical support to try to take this project to the next level, which is what Jerry and I are reporting on today.

Beginning in the fall of 2004 -- well, actually last summer, Jerry took some time and did some in-depth research on best practices in vocabulary teaching while I focused on locating appropriate images and definitions for the terms that we wanted to include, and in addition, we went out and solicited additional terms from faculty in other technical areas, so that we could expand our vocabulary base and began putting this thing together.

Let me show you some examples.

So when the students -- when the students enter the

vocabulary guide, they first see this alphabetical index, and then can select -- which jumps to a list of terms, and then in each case -- so now we have the term -- we have a definition, we've included external links wherever possible, we've included much better -- much more representative graphics, and then in addition, we've included more detailed vocabulary information, so the students can get a handle on the type of term, how it's used, similar terms, and related terms.

I think we've got about 150 -- and then when they've finished with each term, of course then they can jump back to that list or jump back to the index, pick another term, and so forth.

So from their dorm, from their laptop, or anywhere in the RIT environment, students can access this 24/7 and use it to support their vocabulary learning.

We've used it with a couple of sections in a couple of different majors, and our plan is this fall to implement this in -- across the industrial and science technology curriculum, and to continue to expand this to make it sort of a universal tool available to all the students in industrial science and technology.

Jerry?

Let me jump out of this.

>> GERALD BERENT: Testing, one, two.

Am I loud enough?

>> AUDIENCE MEMBER: You're good.

>> GERALD BERENT: Okay.

Well, Ray has touched on many of the aspects of the vocabulary reference tool, and illustrated it.

And now let's just run back and see what our goals and standards were for developing this reference.

Obviously, we wanted to pick the technical vocabulary that the students need for their specific programs in science -- industrial science and technology.

But very importantly, we wanted to use the best practices in vocabulary teaching and learning.

We wanted to try new things and make sure that what we were doing was state-of-the-art vocabulary teaching.

Obviously, working with Deaf students, we wanted to orient this site toward visual learning.

After all, Deaf students are visual learners.

And so that's why we have photographs that reinforce word meaning, other drawings, charts, and other visuals.

We also wanted this vocabulary reference tool to be easy to access and to be flexible in -- in its usage, so online access provided the best way to access the vocabulary reference tool.

We wanted something that could be used in class, along with the teacher's guidance, out of class, or for totally independent learning in some area of industrial science and technology.

We also wanted to have a tool that could be expanded easily, could be refined, and could also be modified for use in other discipline areas, so we have tried to design it -- design the tool with -- following all these goals and standards.

Ray has shown you the alphabetical technical terms that the students start with.

You saw, from the examples, that there are simple definitions for the students.

We wanted to use -- in framing the definitions, we wanted to use high-frequency vocabulary that the students would be likely to know, so that the definitions

would be meaningful, and then very importantly, we illustrated use of each term in an actual sentence context.

And then if you remember from looking at the sample pages, there's a little table that has synonyms for the technical term, antonyms, where relevant, and related words where by -- by "related words," if the target technical term was a noun, like -- or a process, like "casting," and there was a related verb that we felt the students should know, then we would put "to cast," for example, under the related words, say that it was a verb, and give a simple definition of that verb.

Okay.

Here is just a selection of sample terms that we have categorized for you to see by part of speech.

So there's a sample of nouns and noun phrases.

Notice that if you're dealing with a technological field, you're not just going to have single-word nouns.

You're going to have a lot of compounds and other noun phrases, and the -- our vocabulary reference tool, accordingly, has noun phrases like printed circuit board and so on, rather than just single-word nouns.

At this stage, the majority of the technical terms are nouns and noun phrases.

This will change as we expand the lexicon, the set of terms that we're targeting.

However, in these particular fields, students are dealing largely with tools, processes, parts, so there will naturally be a lot of nouns and noun phrases in such a vocabulary reference tool.

We didn't use the grammatical term "GERUND" with the students, but I just want to show you that there are a lot of terms that end in I-n-g, so you can see we have drilling and necking and so on, and then there is a fair

number of adjectives that help to describe the nature of some of these technical items and processes.

Now, an interesting feature that we incorporated is semantic associations, or semantic features.

What we did was, we looked at the full body of technical terms that we were using in the first phase of this, the 150 or so terms.

And we said, "How can we break that down into smaller semantic units that would help students to see commonalities among sets of different words, and to see the building blocks of meaning that go into these items?"

So we came up with this list of 18 semantic associations that, in combination, could describe all of the 150 technical terms that we have defined so far.

And I'll show you an example of how those sets go together.

To describe specific items.

Okay.

So, for example, in defining "watt," we know that it is -- it pertains to a type of measurement.

We know that it is a measurement of electricity.

I mean of energy.

And the specific type of energy is electricity.

So you can see there, you can actually spell out these semantic features in a sentence, and say, "A watt is a measurement of electrical energy."

Sheet metal is material.

One of the most salient properties of that is that it has a

surface.

And so material and surface are the semantic associations for sheet metal.

So sheet metal is a material that forms a surface.

And in this way, the students will start to see various categories and get a deeper level of processing of a word than more -- more than just its meaning and its use in a sentence.

You can take these bundles of semantic associations and help students to see how two similar terms actually differ.

So if you look, for example, at grooves, the third one down, and fracture as a noun, the last one, they both pertain to a surface.

They both are the result of something.

But you can see that the middle feature is different.

The grooves involve an action, and the fracture is more generally associated with energy that could -- that doesn't have to happen by intentional action.

So for improves, the sentence on the right says, "Grooves are made into a surface through an action that has a specific result.

Namely, a, you know, channel, a lengthy channel that's carved out in a concave way."

But a fracture can happen incidentally, so a fracture occurs in a surface because of energy that creates a result.

And that energy could be an impact.

It could be heat.

It could be a variety of things.

So in that way, we can show very fine distinctions among words that students might not otherwise think about in that way.

In reviewing the literature on vocabulary and teaching and -- vocabulary teaching and learning, primarily from the field of teaching English as a second and -- or foreign language, we wanted to make sure -- we wanted to validate our selection of methodologies, and adapt some as well that clearly reflect best practices in vocabulary teaching and learning.

So right now, the page entries for each term permit multiple encounters with words.

These are all characteristics of good vocabulary teaching techniques.

The student has multiple encounters through seeing the words, seeing the definitions and so on, but also in linking it to the classroom, the student will be reading about these terms in textbooks and other materials, will be encountering the terms in lab set settings, and so on, so we're contributing to the multiple encounters.

We're connecting words to the students' world because clearly the words are required for success in these industrial sciences and technology majors.

So we're linking it both to the students' academic world and ultimately to the students' career world.

We're attempting to promote a deep level of lexical processing by having not only definitions, but having supporting visuals, having synonyms, having semantic associations and a variety of information that facilitates deeper processing than just saying, "A watt is a measurement of electricity" and leaving it at that.

Clearly, along with promoting deep -- a deep level of processing, we wanted to facilitate imaging because it's been established both for Deaf and hearing learners of

second language or Deaf learners of English that you need to -- you need to process the meaning of a word both linguistically and visually or cognitively to have this double processing, this dual processing of lexical items is a principle of best practices in vocabulary teaching.

So that's why we have photographs and charts and images and so on.

We've attempted to use a variety of techniques to help support students' learning and using of these vocabulary terms.

We do need to increase the number of techniques from what we have now, but we've only been able to get things to the point that they're at.

We know that we have to go beyond that.

And finally, for vocabulary teaching and learning, you need to encourage independent learning strategies, and the accessibility that I mentioned a minute ago allows students to study these technical terms independently in small group settings, in a larger instructional setting, or anywhere.

We have developed a variety of assessment tools for this first phase of implementation.

We actually implemented the use of the vocabulary reference tool during spring quarter -- this past spring quarter, 2005.

The enormity of the project didn't allow us to implement it as early in the year as we wanted to, so we implemented it about mid-quarter, mid-spring quarter.

In the manuscript version of our paper, you can see the -- the faculty feedback form on the use of this vocabulary reference tool, and the student feedback form.

To summarize very briefly some results of that feedback, the -- the faculty said -- and remember, this

was in a fairly short period of time.

The faculty said that the students were somewhat receptive to using the vocabulary reference tool where the other choices were very receptive and not receptive at all.

So this, for a start, we were very pleased with for that short period of time.

One of the faculty members who employed the vocabulary reference tool felt that the student use of it may very well, indeed, have affected their performance on the final exam, that there was some evidence there that it really did affect student performance.

The two faculty members who employed the reference tool were -- were positive about most components of the resource, but especially the visual components.

Obviously, because of the need for the Deaf students to visually process the technical terms.

So you would expect to get a positive assessment of those very positive features of the tool.

The faculty members made a couple of specific recommendations.

They said that we should take these technical terms and group them -- in other words, have cross-referencing.

Right now, we have alphabetical referencing.

We should cross-reference them according to topical groupings.

So put all of the electrical-related terms in a list, all of the mechanical terms in another list, and all of the machining terms in another.

They also said we should have more consistency across the various page entries.

Now, the lack of consistency right now is simply the result of being in the process of building this resource, and so for some entries, we have links to websites.

For others, we haven't yet found the links to relevant websites.

So right now, it's natural that we would have some inconsistency which we will continue to work on, to bring consistency, where relevant, to all of the page entries.

The results of the student evaluation survey, at least part of them, the more meaningful parts that I'm summarizing here, the students' response to how helpful this tool was for learning technical terms, 75% said a little helpful, and 25% said very helpful.

And the other choice was "not helpful at all."

No one said that.

Now, again, remember there was only a couple of weeks, few weeks, that the students had available to them.

So we feel that to get this positive response, even to say "a little helpful," in such a short period of time indicates a fairly high level of reliability because if students really didn't have time to use and benefit from the tool, we feel they probably would have said it's not helpful, because they hadn't had an opportunity to find out if it was or not.

So we are quite pleased with this preliminary feedback.

To the question, "How helpful was this tool in preparing for the final exam," we got roughly the same percentage.

The reason it's not 75/25 is because there was one person that doesn't respond to that item.

So, again, we are very pleased with these preliminary

responses on the evaluation of the vocabulary reference tool.

The best-liked components are salient features of the site.

Clearly, the students like having a nice alphabetized list of terms and they like the simple definitions.

So we must be, you know, doing fairly well in providing accessible definitions that use high-frequency vocabulary to define the technical terms.

And obviously, the two primary visual components for visual learners are highly regarded: The photographs that describe the technical terms and the drawings and charts.

Okay.

Here is -- we have two -- I think two slides on this.

Here are our planned refinements and expansion of the vocabulary resource reference -- vocabulary reference tool, both based on our intentions through this process and on the feedback that we got from faculty and students.

We're clearly going to expand the list of terms.

We're clearly going to attempt to bring consistency to all of the page entries.

We will follow up on the recommendation to cross-reference the items into topical groupings as the faculty recommended.

We want to continue to study our list of 18 semantic associations, to make sure that they accurately reflect the features that go into the meanings of these terms and adjust that as necessary.

And then it would make sense to cross-reference the vocabulary items according to clusters of semantic

associations.

One thing we know that we have to do is to illustrate the use of these technical terms in larger segments of scientific discourse.

Right now, we simply have one sentence that illustrates the use of the term, plus any of the items that link to a website will take the students to a more naturalistic setting where they can read more about these terms.

But what we would like to do is to include -- to capture a paragraph or a longer segment of discourse within the particular fields where those terms are being used naturalistically in the scientific literature.

We need to add word tables and schematics to illustrate relationships among terms.

In other words, we have the semantic associations, we have various charts and things.

We need to use some of the kinds of visual network schematics that will help students, again, visually to see the connections among these terms and the elements of their meanings.

Obviously, we want to add more links to related material and resources on the web, or, you know, in other files or in other curricula across campus.

Another thing we intended to do that we will continue to work on is to develop exercises where the students can actually practice using these technical terms online within the resource, and also to develop assessment activities in the site that will allow students to get some corrective feedback on their use of these terms.

So that's the end of the show.

And we have about 10 minutes for questions and answers.

Yes, Beth.

>> AUDIENCE MEMBER: It's wonderful what you've done here.

>> GERALD BERENT: Can you go to the microphone?

>> AUDIENCE MEMBER: Oh, sure.

Sorry.

I think it's really -- is it on?

>> AUDIENCE MEMBER: Yeah, it's on.

>> AUDIENCE MEMBER: Can you hear me now?

>> AUDIENCE MEMBER: Yeah.

>> AUDIENCE MEMBER: Okay.

I think it's really exciting what you've done and I'd like to know that maybe it's available to other colleges at some point, and I -- I can't wait to see you starting to get it in categories.

Now, I guess I'm wondering, is there any way it could be connected with, say, a video lecture then that a student could link into a spot in the lecture?

You know, when there's an instructor, is there an available at the same time with that at all?

No?

I don't know.

(Laughter)

>> AUDIENCE MEMBER: Do you know how when you have archived lectures for the students, is there a way that it can be linked in to that at all?

>> RAYMOND GROSSHANS: I'll put that on the list of

things to do.

>> AUDIENCE MEMBER: Okay.

(Laughter)

>> AUDIENCE MEMBER: Oh, I'm -- is it mostly for the RIT students, or is it for the NTID, or for both?

>> GERALD BERENT: It's for NTID students who are pursuing associate's degrees here, but there are more and more opportunities for these students to continue their education in other colleges of RIT.

They're still NTID students who we call cross-registered students, and so the goal is to establish a model with which these students can continue to pursue their technological education, and a model that professors in other colleges of RIT could adopt as they continue to work with RIT -- Deaf RIT students.

>> AUDIENCE MEMBER: Yeah.

That's great, that's great.

Thank you for your work on it.

>> GERALD BERENT: Thank you.

You're welcome.

Other questions?

>> AUDIENCE MEMBER: I was wondering -- I was wondering if you were also planning to have a video clip of the word signed so that if they're getting a listing of vocabulary prior to a lesson, they could then start matching also the visual, the text, and the sign.

And then also possibly a video of the pronunciation for the kids that are cochlear implant -- have cochlear implants or that are oral or hard-of-hearing, so that they can better lipread and follow along with instructors

for those students who use that?

>> GERALD BERENT: Those are great recommendations.

I -- the way I see it is the sky's the limit, and whatever we can incorporate over time, we would incorporate, to make it of optimal benefit to all students, whatever their communication background is.

Do you have anything to add about that, Ray?

>> RAYMOND GROSSHANS: Yeah.

RIT is switching to a new central computing system for the students this year, and we'll need to take a look at the available bandwidth, because those are -- those are great suggestions but they're also bandwidth hogs and we'll have to make sure we can manage all that.

>> AUDIENCE MEMBER: I'm not sure if I'm going to word this question right or not.

Did you develop the program for putting this together or did you use an established program?

>> RAYMOND GROSSHANS: This was -- ultimately, we wound up using just PowerPoint.

>> AUDIENCE MEMBER: Okay.

>> RAYMOND GROSSHANS: This was all done with PowerPoint, because we initially tried in HTML format, but the -- with the time constraints we had, the programming demands were just going to be overwhelming, because we -- we wouldn't be able to just use text.

We would have to process the text and the images, and then create all the files, et cetera.

It was much easier to do with PowerPoint, just for this trial version, but I think if we want to go farther and include more resources, we definitely will have to move

towards an HTML-based package.

>> AUDIENCE MEMBER: I -- the reason I asked is that I'm from a rural public education program, and I've been developing a similar thing on Moodle, that is for social science vocabulary, and it categorizes it by the categories that I put in, and then it's alphabetized under each category and it also has a hyperlink.

I've put in a hyperlink for all the vocabulary, and then I can add the visual picture.

I haven't gotten that far with it yet.

But it also then can be printed, and the students can carry it in the back of their notebook.

But I've only been working on it basically by myself, and -- but I've got about 350 words in under geography and history, but I haven't -- mine doesn't have the categories like yours does for parts of speech and those type of things, but it's unlimited in how long I can put in the definition and those kind of things.

So I was just wondering, because there's quite a bit of similarity but a little bit of difference.

And mine is available on the web.

You can -- I can access -- the kids can access it from anywhere.

>> GERALD BERENT: Yeah.

I'd like to write down that URL.

>> AUDIENCE MEMBER: Yes.

Thanks.

>> AUDIENCE MEMBER: I think you said this, but I've forgotten the answer.

How do students access this?

Is it a CD or is it online or server?

>> RAYMOND GROSSHANS: Right now, it's online through "my courses."

>> AUDIENCE MEMBER: Thank you.

>> RAYMOND GROSSHANS: Yeah.

"My courses" is the central RIT educational computing system that students are automatically linked into whenever they register for a class, so all their class information is available and instructors can post their lectures, notes, and assignments and testing and so forth off of the central location.

>> GERALD BERENT: Any other questions?

Don't forget to complete the yellow evaluation form, and that's being passed out, and thank you all for coming.

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(Session ended at 3:00 p.m. ET)

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