

# **Instructional Technology and Education of the Deaf**



Supporting Learners, K — College  
An International Symposium

National Technical Institute for the Deaf  
Rochester Institute of Technology  
Rochester, NY

---

## **Captions**

**(T11C)**

### **C-Print and its Impact on Student Learners: Preliminary Findings from Students in Middle School Through College**

**Lisa Elliot**

---

ROUGH EDITED COPY

C-Print and its impact on student learners: Preliminary  
Findings from Students in Middle School through College

Lisa Elliot

June 28, 2005

11:00 A.M.

CAPTIONING PROVIDED BY: CAPTION FIRST, INC.

PO BOX 1924

LOMBARD, IL 60148

\* \* \* \* \*

This is being provided in a rough-draft format.  
Communication Access Realtime Translation (CART) is  
provided in order to facilitate communication

accessibility and may not be a totally verbatim record of the proceedings.

\* \* \* \*

>> good morning, everyone.

I'm Lisa ELLIOT and I'm a researcher with C-Print, and this is my colleague Pam Francis who is our main technical person in charge of training and all sorts of wonderful things, maybe you could call her the chief cook and bottle washer.

Pam and I are here today, our colleagues, Mike Stinson, Donna Easton and GINA Coyne are here as well.

This morning we're going to do a brief review of our newest C-Print technology that we've been researching in a number of different schools, and then I'm going to tell you some of the results from this research that we've had so far.

One of the things that is important as educators, we recognize the importance of active learning in the classroom, this is not just for deaf students but hearing students as well.

In our privilege use research, we learned that -- previous research we learned that many students were using active learning strategies with their notes after class.

But we found that it -- we thought it would be really neat if students could be using active learning strategies in class as well, just like other hearing students do.

Many of us when we're teaching expect students to take notes themselves but if you're a deaf student in the classroom it's very difficult to negotiate watching the interpreter, taking notes, participating in the discussion, all at the same time.

And so what we've been doing with C-Print for the last five or six years is trying to develop a system that

allows us to have students both watching a C-Print display and being able to take notes for themselves during class.

And this is different than other speech-to-text systems that are used.

So I think right now I'll let Pam tell you what it is we're researching and she's actually going to show you a sample of some notes that are used in an RIT class here on campus this quarter, and then we'll go back and look at some of the studies that we're doing.

>> well, this will be interesting.

Because I'm not wearing the microphone for long.

So hopefully everyone will be all set.

I'm not focusing a lot today on the technical stuff.

I'll show you very briefly, Lisa is going to focus on the research.

We're going to briefly show you some of the tools our students have been encouraged to use so that you can put the pieces together as we give you the research information.

Now, what you're seeing here actually is our client application which is what if a student has a second laptop can be used.

And you'll notice to the right of the screen, your right, there's a note taking pane, so I'll show you some of the note taking options.

If a student chooses not to access the information to type their own information in, they don't have to use the note taking pane, they can close that right up.

Okay?

And they can see the full screen.

They can adjust the size of their font and the colors on their screen as appropriate.

We won't take the time to do that today.

And they can highlight information that is important that they want to remember after class.

So let's say that this is important information that I would like to remember after class or to refer to after class.

So I can highlight that information, not the best color highlighter, and what will happen after class is that text will be if you print on a black and white computer -- or black and white computer, that will be in gray scale, but let's say I'm a student who would like to create my own set of notes so that I don't have to have a ten page transcript.

So I will show the note taking pane, okay?

I can resize the pane to be whatever size I feel is appropriate, and let's say there's information that I would like to take over and create a summary W so I can highlight that information and just do a copy and paste and what that will do is create notes to the right.

At the end of class, I can print just that text.

I don't have to print the full text on this side of the screen.

And I can create several of these notes.

So for example, I create -- if I create another note, they will show up individually so that I can do edits or I can view them all together.

Well, today I'm not viewing them all together.

For some reason.

And I apologize for that. So that's the second option, and the third option would be that I could type my own information, so let's say that this is information that is important for me to know.

I hit enter.

I type in the information that I want to show up in the notes and that information, once I print or save the document, will show up as indented text.

Okay.

I think that's all that I need to show you today as far as the note taking tools.

The other thing I would like to show you just briefly that the students have been using is messaging, and I'll bring up the messaging screen, and I'll type in a question.

I send my question over to the person who is doing the captioning, and you'll notice that the question shows up.

I can respond to the question as a service provider, send the information over and for some reason it is not showing up, and I don't know why.

And that -- I apologize for the technical glitch that I'm not understanding right now.

Normally what would happen is the information would show up right in this pane and I actually think what is happening is I have a white font, so I think my actual font is white showing up on a white background, that's why you're not seeing it, so I can go in and change that... nope, maybe not.

Let's try it and see what happens.

Not going to show up.

I'm not sure why it's not showing up.

The disadvantage of having the actual developer machine.

So normally your message would show up there, we have the three option, again, the note taking pane, very easy to switch between panes, it's tabular, so the student can move around, and I think that is all you need to know, and Lisa is going to give you lots of information about how our students are enjoying it.

Thanks, Pam.

Well, right now we're in the midst of two very exciting studies, one that we're doing with middle school and high school students and for the remainder of this presentation, I'm going to refer to that as the secondary school study.

And the other study is with college students.

The secondary school study is taking place across the country, we're working with school districts on the west coast, in the midwest, and here in the Rochester area, and the college study is taking place both here on the RIT campus and at another campus in the south.

So we have a very diverse group of students.

The courses that the students have chosen to use for C-Print include a wide variety, English, social study, both are very common, but also things like AP physics and biology and for the first time we tried a Spanish course, an introductory Spanish course and if you're interested in how that might work, you can talk to GINA Coyne afterward because it's a really interesting process.

What happened for the secondary schools, therewith students were nominated by their itinerant teachers, the student, the itinerant teachers and their classrooms worked out together which class they would be in.

It's very important to get the buy in of the classroom

teacher especially at the secondary school level.

Most teachers are very interested in helping out, and they're very comfortable because in this day and age in most classrooms there are so many different adults in the classroom at the same time that they didn't think it was going to be a problem to have one more person in the room.

At the second -- at the college level, we randomly selected students in courses that already were using C-Print commonly, particularly here in the IT campus, there's been many people who have used C-Print in their classes so we knew what courses students might be participating in and we went and randomly asked people, of course students have to agree to participate, because at the end of the trial, then they need to fill out a questionnaire and possibly be interviewed.

So you still have to get some sort of an agreement, it's not a totally random experiment.

The way the designs work, they're a little bit different.

At the secondary school level, we have a trial period with C-Print and five weeks without C-Print.

Also half of those students use C-Print with voice recognition software.

The other half are using C-Print that is typed input.

And then the second half of that trial is without C-Print so they have whatever services were called for in their I.E.P.

During the C-Print trial students chose whether they wanted to continue with those additional services, so sometimes students were using both the interpreter and C-Print, sometimes they said they didn't want to continue with their traditional services during the C-Print trial so it was a real mix.

And the -- the period of not using C-Print was either

prior to C-Print or afterward, and we also had teachers filling out performance measures with C-Print and without C-Print.

So you could get a real contrast as to how students were doing with and without.

So the college study, the design is a little different.

We have actually three groups of students, one group that is using C-Print with voice recognition software for the entire quarter.

A second group that is using C-Print with standard typing abbreviation system C-Print, and a third group that is an interpreter only group that is not using C-Print at all.

In the secondary study we have collected data on 17 students thus far.

We're hoping to get 40 by the end of the trial and that should be wrapping up some time in the next school year.

We're about halfway through the college study right now.

We have 36 students who have used the C-Print and a total of 50 students all together, but today I'm really going to focus only on the C-Print use, so we're not going to talk about the interpreter results at all.

For the secondary study, what happens is that there's an orientation that begins before the trial, and during that orientation, the captionist meets with the students and the classroom teacher and the itinerant teacher.

Generally that is the minimum.

I also come if I'm available.

So it's good for the student to see who is going to be



collecting the data as well.

Parents are invited and encouraged to attend that meeting.

And there are also other people who might show up.

For example, we've had interpreters, note takers, the support service administrator of the school, perhaps the vice principal or principal.

It can be really intimidating because some times there are the one student and 12 adults in the classroom.

But we have this very thorough orientation meeting before things start so that everybody knows what's going to happen.

And during the orientation the captionist explains the software to everybody in the room.

They explain what is going to happen during the trial.

The captionist has an opportunity to look at the classroom setup and decide where he or she is going to sit, and there's also decision made at that time about who is going to introduce the trial to the classroom.

And so sometimes the student is very enthusiastic and feels coverable introducing it themselves.

Some times the captionist does it.

Sometimes there's a team approach.

But at any rate, the students, the whole entire class is oriented toward what is going to happen.

At the post secondary level, the captionist meets with the student who is going to be using the software.

And the professor receives notification that this is going to be taking place in class as well, but there's no formal

meeting.

However, the captionist gives the professor an opportunity to answer questions.

They send an e-mail, they might call.

They might send a regular piece of mail, and so they give the professor an opportunity to ask questions as well.

So our position is it's really important to get everybody as much information up front as possible.

The setup for all the trials is pretty much the same.

The captionist has a laptop and the student has a laptop that they use for different things, for example, to view the display themselves, also for communication, that part that Pam tried to show you that was just not working very well today, but it was generally working very well, and most of the captionists usually use the communication device at the beginning of every class to sort of check in with the students and say how are you doing, what's going on, do you have any questions, and this is nice because it establishes a rapport between the captionist and the student.

The student also needs to use that laptop to be able to do the highlighting and note taking on services.

So for example. We have had the work with the other schools and sometimes they have a shortage of equipment, and so they say, oh, would it be okay if we only use one for the captionist and we say, no, you can't just use one laptop, you need to have two, because the students need to be able to use the software, and then they say, oh, yeah, I forgot, but they both need to use laptops.

After class we also give the students the opportunity to use the software as well, and this is a real difference from previous studies because in the past students just

receive notes from the captionist and that was it.

But now we've provided students the opportunity to use the software on their own, and we give the student who participates in the trial the option of using the software on their own laptop or we've installed it in school libraries or computer room or, you know, wherever we can so that the student has an opportunity and they feel comfortable, one thing we've found particularly with the younger kids is that they're reluctant to use the software after school, because if they have a computer at home, they compete -- they have to compete with other family members to use it, and so we found that it's been more effective for them to use the software after class with a resource room teacher for example, or their itinerant teacher some place other than home so they don't have to compete.

Some of the information that we're collecting from the students, from all the students in all the studies, so that we can talk about everybody at once, degree of hearing loss, and we have students who are participating with studies who have a wide range of hearing loss from just being hard of hearing to profoundly deaf, our reading ability, and this comes up again and again as to how much reading ability students need to have, and we found it's been very interesting this year.

We've -- we've had a few students whose reading abilities have been very low.

Lower than we had previously expected students to do.

We've always said that you need probably a fourth grade reading level to be successful with C-Print.

But we've had a few students who have come under that bar, some kids in the second and third grade reading abilities and they've been very, very, very good.

So I'm not going to say that you need a fourth grade reading ability anymore, because we've had some students who have been very successful at lower

reading levels.

We also find out what communication process students have, whether they're primarily, whether they're ASL, and again we have a wide range of students who are participating and we also find out what the student's motivation for success is in the course.

If the student is very motivated they will probably be motivated to use C-Print.

If they're not very motivated then they really don't care about doing well at all and it doesn't really matter what kind of support services you provide.

Thus far, most of our students have been very motivated but there have been some exceptions.

We'll get to that later.

Again, for both studies where giving students a questionnaire about their experiences with C-Print so that comes at the end of the C-Print trial portion and that questionnaire includes how did they use the C-Print display?

We'll talk about that in a minute.

How did they use the educational tools and what did they do with the Texas after class.

For a certain group of students, we've already randomly chosen to visit certain classrooms and so we've done about 9 observations in the secondary group and nine observations in the post secondary group, and what do we look for, the way the classroom is set up, how the student is using the software in class, what kinds of interactions does the C-Print student have with other people in the classroom?

Is this isolating the student or is it maybe causing the student to be more engaged with other people in the class?

Also, after we do those observations we go out and we do interviews, interviews with the students, interviews with the classroom teaches, perhaps interviews with the itinerant teachers and we also have an ongoing study where we're talking to captionists as well.

So we're pretty much blanketing all of the users of C-Print in the classroom setting.

Okay.

Now, here is where things get a little bit different.

For the secondary study we've also given students a questionnaire about their experiences without C-Print so we can compare those too.

And we're asking those classroom teachers to assess the performance of the students with and without C-Print.

For the college study, we're doing something a little different.

Remember, for the college study, we have a group of students who don't receive C-Print, so we're giving those students a questionnaire as well, and we're looking at all of the post secondary students' final grades for the course they've selected.

So what did we find?

Well, first of all, we found that with the secondary students 70% of them use the C-Print display almost all the time in class.

Remember, there's the choice, because other services were still in the class room.

In the post secondary group, about 92% of them used it almost all the time.

How did they use it?

You can use C-Print in a variety of different ways.

You can use C-Print to just sort of fill in missing information and look at other things going on in the classroom or you could deliberately, like 50% of the time focus on the interpreter or the teacher and then back to C-Print or you can focus most of your attention on the screen.

And you could see that in those secondary and post secondary groups, the user patterns were different.

In the secondary group, we had about half the students who use the C-Print display to just fill in information with that occasional glance of the screen and half of them who really focused all of their -- excuse me, half of them that switched between the interpreter and the teacher and C-Print.

And the post secondary group, things were split very evenly amongst the three usage patterns looking at the screen on occasion, switching your attention between the two and then focusing only on C-Print.

Okay.

In terms of how often did people use those educational tools?

I think this is really one of the areas that is most dramatic, because we didn't know, when we started out we had no idea how students would be using this -- these tools.

This is a big deal.

In the past students didn't have the opportunity to take notes and to pay attention.

This is revolutionary.

Well, so we really didn't know how students were going to use this at all.

In the high school and middle school group, 50% of the students use the educational tools five or more times which is pretty much all the time in class.

And for the high school and middle school students highlighting was the most popular method.

We would probably figure that out.

It's kind of fun to highlight.

And writing ones own notes was the least popular.

For the college level students what they chose to use was different, again, about half of the students use those educational tools fairly regularly.

For them writing their own notes was the most popular things to do, and the cut and paste function or what we call tagging was the least popular.

It's still used but not as often.

Yep.

Okay.

So here is one of our -- remember I get to do one of these interviews with students.

This is one of the quotes that talks about why she likes the note taking and I'll just give you a chance to look at that.

>> so there are two things happening in this quote that are reflected and have been reflected throughout.

First of all, it seems that by being able to use the educational tools, the focus is more on what's happening during class, because kids are more engaged, and secondly, it reinforces what the student has to remember because they can be actively processing the information just like everybody else in class.

Here is an example of a quote from a secondary school teacher.

It's interesting because this is an example of a student who is in a mainstream classroom, an excellent teacher, in fact this teacher taught my son.

I know he's a very excellent and very demanding teacher and he was previously trying to get this particular student who had learning disabilities on top of her hearing loss to function just like a regular student in the classroom.

And this is not uncommon.

So he had an expectation that she was able to do something which she really couldn't do.

But with C-Print she was beginning to be able to master some of those skills that he had planned for the rest of the class.

Also in this particular classroom, this teacher was really working with the student on note taking skills in general, so having C-Print in the classroom really reinforced lessons that were trying to be learned as well, so this was a great example, and afterward or during the rest of the conference, if you want to talk to me about other ways that this teacher used C-Print, please come and ask me because he did some very innovative things with the class, not just be (w) the student but with the class as well.

Remember, I told you that the teachers were also asked to rate students performance before -- or with C-Print and without C-Print.

We looked at three different things.

Academic achievement, learning new vocabulary, and class participation.

So without C-Print in all the categories, the rating was



lower than with C-Print.

I will caution you that this is only 17 students so far.

We haven't finished collecting all the data.

And also haven't had a chance to do in statistical significance yet.

So this is preliminary.

It may be just a trend.

I hope it doesn't go away.

But it's -- I want to present this with a word of warning, but I think it's really important, in particular the class participation score, because while it may be that the student might not test any differently, there's something else happening in class.

We had some examples of some students who really were just totally tuned out of class before C-Print.

There was one student in particular who never made eye contact with anybody.

And suddenly he was participating and laughing with the jokes of the other students and started to make honor roll, and it was a dramatic change in class participation.

We also had comments from a number of teachers that said, you know, five weeks is just not enough time for us to really tell you, but we really think that this is making a difference.

So we thought that five weeks was going to be a huge amount of time to test this, but it wasn't enough.

But it was a good start.

Go on.

Okay.

Some of the things that we learned from doing the classroom observations and talking with the captionists casually and also during these formal interviews, some of the things that you probably want to think about when putting C-Print in your classroom, some physical characteristics of the classroom, how many people here have tried to take notes on a teeny weeny desk that is often in the classroom.

I have seen some of the smallest desks in my life.

They don't even hold a regular notebook.

So of course if you're going to bring in a laptop and expect the student to have a laptop, you're going to have trouble.

You really want to have a sufficient desk space.

However, captionists are very -- they have a lot of ingenuity, so often times if the desk is too small, that doesn't mean you can't use C-Print, that means you put it on a laptop stand and put it next to the student.

It's not impossible to use C-Print on a small desk space, it's better if you have a desk, it's even better if you have a table, and a lot of secondary school classrooms are outfitted with tables these days.

The other thing that we found is it's easier for students to use a mouse than to use the little touch pad thingy--do that is often times found in a laptop, and those are easy to buy and really easy to attach, so that works better.

Particularly if the student wants to do highlighting or note taking because there's just better control of the mouse.

Some other things that we've found from doing interviews and talking with the students that may impact the students' use but not necessarily, so first of

all, familiarity with the computer is helpful but it's not necessarily a requirement, especially with younger kids.

They just haven't lived long enough to be totally comfortable with a computer, but you give them an opportunity when you're giving them C-Print to become more familiar with that computer.

So familiarity is good but not necessarily a requirement.

However, what seems to be even more important than familiarity with any particular computer is a student's comfort level with using the computer.

One of the things that I noticed in travelling around to different schools is the culture of the computer in the school.

For example, in one school there's this big threatening sign "do not put anything in these computers because they will break."

So if the student is in a culture where they teach you to be fearful of the computer, then it's going to be harder to get the student to feel comfortable typing away.

So one of the challenges is to make sure that students feel comfortable using the.

Computer, and once that happens they kind of block them, another thing that is important but not necessarily a requirement is the ability to type.

We take that for granted because we all use typing all the time, but especially with the younger students or students who for whatever reason just didn't learn how to type, they may be intimidated by the typing aspect, so that means that maybe they're not going to use the writing their own notes function as frequently as somebody else.

But because of a flexibility of the note taking tools, you can still highlight, so it doesn't mean you won't be able to use C-Print but you're not going to type for yourself

that often.

Spelling skill, particularly with these students who also have learning disabilities, spelling skills might get in the way of them typing their own notes, but, again, we found that these students really blossomed with C-Print because they were given an opportunity to see the written word as it's meant to be and they could use it without having to generate it for themselves.

So being able to [INAUDIBLE]

Is helpful but not necessary.

A word about cognitive processing, we didn't address this directly, but in our conversations with students, sometimes using the note taking skills during class might be difficult if you're a processor, again this shouldn't stop you from being able to use C-Print because you can use it outside the classroom as well.

I think this is the last one.

So to wrap up here, we've had some very positive response from the students.

They've used the educational tools in ways that we didn't expect, perhaps, and we found that teachers are also evaluating their students more positively, in particular, and learning note taking schools and being engaged in class.

That's it.

Finally, you know, just a reminder about the appropriateness of furniture and their skills, the student skills, but this shouldn't stop anybody from using things if you don't have the ideal setup.

Yep.

All right. Anybody have any questions?

Yes?

>> how did you go about determining the students' motivation?

>> we have a questionnaire.

We have a questionnaire that asks them whether they thought that the class was important, how hard they worked in the class.

How often they studied, there are about five questions on that questionnaire and we borrowed questions from other motivational questionnaires that have been used in research on this campus before.

>> can you tell me what the cost was of the -- you know, the equipment setup for everyone -- for paying captionist and everything?

>> that is a better question for Pam to answer.

>> that really depends on what the school wants to invest.

You know, if the school wants to invest in having a laptop for the student to have, laptops are very affordable today, they come with a lot of neat stuff on them, you can get a very quality laptop for \$1,200.

The cost of the software, academic rate is \$225.

So it's not overly expensive deal.

>> the level of pay for a captionist is variable.

We know that some captionists in the secondary schools are being paid 12, \$15 an hour.

And there's some at college level who are being paid 25, \$30 an hour, so it does vary.

So you have to build in other costs too, so I would -- any time you're implementing anything, you have to

build in other costs like technical support, things like that, so that's also a consideration, printing costs, things like that.

>> can you help me understand the specific difference between C-Print and just real time captioning?

>> how much time do we have?

In -- in a few words, real time captioning is verbatim.

Okay?

Word for word, every utterance, whereas speech-to-text system like C-Print is more meaning for meaning.

In other words things that are -- false starts might be eliminated, things that are repeated might be shown visually in a different way.

The information might be bolded rather than retyped, so it's that type of system.

Meaning for meaning.

A lot of discussion.

More of a paraphrasing and there's a lot of discussion out there, there's a term that has been used also for speech-to-text systems like C-Print called text interpreting, so you have a whole variety of terms that are being used, okay, but really it's more of a paraphrase.

Okay?

>> well, and for C-Print, and Lisa just said this, and for C-Print, one of the things, and what we've focused on today is we have the educational tools in the client software and we feel for an educational environment it's more of a learning system, not just speech to text.

Go ahead.

>> where was the study done?

Was it basically in the east part of the country?

>> no, we had -- the question is where is the study done.

Remember, there's two study, a secondary and a post secondary, the secondary study is conducted in the west coast, and here in the Rochester area, the college study is being done in the south as well as here.

We pretty much covered the country and I have the frequent flyer miles to do it.

>> can I tell you how I'm using it.

>> sure.

>> I just purchased it and I'm not sure if I'm using it correctly.

I work in the western North Carolina mountain, I have two deaf students, I use it for one.

I use it as a note taking system N that one class I don't have an interpreter, but I hired a hearing student from two deaf parents that knew the sign, in case the technology failed me, I had a backup very quickly, I'm very fortunate.

It's where you live.

I pay her \$7 an hour to type the 3 classes Monday, Wednesday, Friday, 50 minutes, I bought the two laptops and the software and she's put in a hundred hours training to be the captionist, which I also paid for which will give her certification and possibility of a job opportunity out there, so that was like a selling ticket I had, but as far as a note taking system, they come back and we drop it on a zip drive and printout the ten pages and what I want to learn how to do is go up, you can take your notes and add it to another student, I would like to learn more details of what I can do on my

campus.

>> great, so talk to Pam afterwards.

Yeah?

>> I just want to make one comment about what you said, and when you said I'm not sure whether it's right or wrong.

The thing about something like this is you can use it in many, many different ways.

It doesn't have to be just how we used it in the study.

And it can be used in a variety of ways and you can really manipulate it or fashion it around your situation so that's beautiful how you did that.

>> we're out of time.

I want to thank the interpreters.

This is a very interesting topic.

[INAUDIBLE]

Please fill out the evaluation form.

If you need one, I will pass them out.

[ APPLAUSE ]

\* \* \* \* \*

This is being provided in a rough-draft format. Communication Access Realtime Translation (CART) is provided in order to facilitate communication accessibility and may not be a totally verbatim record of the proceedings

\* \* \* \* \*



Close