

Meaning-for-Meaning in Speech-to-Text Services: A Better Understanding

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Abstract

Speech-to-text support services are growing rapidly in popularity and use. While it is easy for most people to envision what a verbatim class transcript includes, many people do not know or understand what a meaning-for-meaning transcript includes. A common misconception about meaning-for-meaning transcription is that it's a summary or "dumbing down" of the message. In reality, a meaning-for-meaning transcript contains a concise and thorough message, richly detailed, and in full English grammar. This presentation will describe the process and product of meaning-for-meaning speech-to-text services, as well as examine methods to quantitatively analyze the completeness, accuracy, and readability of a resulting transcript.



Speech-to-text services are common accommodations for individuals with a hearing loss. The service provider converts the spoken word into a written text document. These service providers can be divided into two general categories: verbatim and meaning-for-meaning. This paper will focus on providing a better understanding of meaning-for-meaning services. It will consider the human factor or the service provider not the specific system or technology. The technologies for the various systems are all very similar but it is the human factor that will decide the quality of the final document. Performance is the critical part of the equation.

It is important to begin with a definition of meaning-for-meaning. When asking a group of people to define meaning-for-meaning the answers would vary greatly. Words like "summarization" and "paraphrase" come to mind but neither gives a full picture of what meaning-for-meaning in speech-to-text services actually means. A general definition might be, "a concise and thorough translation, or paraphrase, of spoken English content." However, the best way to explain meaning-for-meaning is to consider the difference between spoken English and written English.

Spoken English and written English are in effect different languages. When people speak, even in a lecture format, they do not always use Standard English. They often change subjects in midsentence or speak in sentence fragments. If these spoken errors are written in as a verbatim transcript it can be confusing.

There are many benefits for the client in using meaning-for-meaning services. First the transcript is a model of written English. Even though the speaker may not use perfect grammar, the service provider will take that spoken passage and adapt it to an understandable written format.

The transcript is a succinct delivery of the spoken information. For example, information that is said multiple times would be emphasized through the use of formatting such as bold text instead of repeating the phrase multiple times. Extraneous words and vocal interferences such as “uh” and “you see” would be removed.

The transcript is a manageable length. For an hour-long class the transcript would average 8 to 10 pages, depending on the service provider. If the transcript were 20 pages for each hour of class the student might be overwhelmed with the amount of text.

Meaning-for-meaning text includes the pragmatics of spoken information. This means that not only the words are typed but also the meaning behind the words which are indicated by inflection and tone of voice. Environmental information also is included so that the client is aware of why and how comments pertain. For example if a cell phone rings in class, the student would need to know this in order to understand why the instructor is suddenly angry. The service provider would also include the tone of the message for example by putting the word sarcasm in parentheses to show that the speaker is not being serious.

And finally, the meaning-for-meaning transcript is visually accessible. The service providers use bold, italics, numbered lists, bulleted lists, and such to organize the information in a format that is visually organized. Service providers also learn to use white space efficiently to help alleviate eye strain for the client.

Students who are deaf and hard-of-hearing rely this service to understand the content of a class. This is not always easy when the linguistic meaning of the passage does not reflect the speaker’s meaning. An example would be in a question versus a statement such as: *Can you see (glimpse) Mary?* compared with: *Can you see (imagine) Mary?* Each of these sentences contains the exact same words but have very different meanings. Another example is with sincerity versus sarcasm: *The door is over there (direction).* compared with: *The door is over there (order to leave).* It is easy to see how misunderstanding can occur when the linguistic information found in the tone of voice and inflection is missing from a written translation of the spoken word.

After discussing what meaning-for-meaning is and how it can benefit the client, it is then important to look at the mental processes required by the service providers. By sitting in on any college class, it is easy to see that spoken English and written English can be like two different languages. When the instructor speaks extemporaneously, the word choice and flow of speech is very different from when the instructor reads a passage from a book. Once this difference is understood, then the need for meaning-for-meaning services becomes clear. Because the service providers are not simply typing everything that is heard they must use a complicated mental process to produce a clear and grammatically correct translation.

The following is a verbatim transcript of a presentation on the topic of deaf and hard-of-hearing students transitioning from high school to college:

In presenting a workshop out at Houston last year for their teachers for the deaf we looked at a number of different issues in bringing up three or four specific paradigms that you need to look at. Students who are deaf sometimes if they use sign language may not have parents that know how to communicate effectively. So

what do you do? Sometimes the teachers become the ones sometimes it is the voc rehab where you need to go. If you look back at the nuts and bolts that Jenny helped with there are some very basic facts. That students even know what their hearing loss is. What do they need for accommodations? If you send them off to college like here at Jacksonville do they know what their insurance is? Do they know health life car whatever? So looking at that.

A deaf individual reading this would probably gain very little understanding of the topic; whereas, a hearing individual would understand more from hearing this passage spoken than from seeing it in written form. The human brain processes information differently when it is received auditorially or visually. This is why it is important to translate the spoken word into a clear and understandable written format.

Traditionally it was thought that a verbatim transcript was the best service and that meaning-for-meaning was a substandard alternative. However, after seeing the example above it is easy to see that verbatim may not always provide an optimum transcript. It is important to remember that not “one size fits all” in service provision. In fact, one service may not fit even the same student in all situations. For years, the myth that “ASL was bad English” was perpetuated; however, ASL is now accepted as a distinct and separate language from English. In the same way, meaning-for-meaning is not bad verbatim. It is a distinct and different service, which may be preferable in some situations.

The mental processes a meaning-for-meaning service provider uses are very similar to that of an ASL interpreter. For this reason, looking at various interpreting models can help explain how a meaning-for-meaning transcript is produced and how service providers can improve their skills.

Verbatim service providers operate at the lexical level. They may need to process homophones such as “their,” “there,” and “they’re.” Otherwise there is little processing required since the words are spoken and then translated to text via a stenography machine.

Meaning-for-meaning service providers work at the phrasal and sentential level. The service provider must hear a complete thought or concept before mentally translating it into a written format. If the service provider processes at the word level, then the meaning may be lost.

Looking at some interpreting models can be useful at this point. The Colonomos Model of interpreting looks at taking the original or source language and changing it into the new or target language. In speech-to-text, the two languages are both English but the concept is the same since spoken and written language have distinct differences. The service provider must first listen to the spoken word, and then understand the meaning before creating the written transcript. If the service provider does not understand the message, she will not be able to adequately represent the message at the contextual level (Colonomos, 1989).

A second model of interpreting which is useful is the Gish Model. In this model the service provider is asked to look at the different levels of a message. The speaker’s goal is the overall purpose to consider. Below that is the theme of the message. On the third level are the objectives to convey the theme. The fourth level is the units of information used to communicate the objectives and finally the individual data and details. Often a service provider becomes stuck on the lower level of individual details. When this happens, the overall message can be lost because a series of individual details may not flow into a cohesive message. If a service provider cannot keep up with a speaker, then it is important to move up a level in order to include as much detail as possible while maintaining the overall message (Gish, 1995).

One example that demonstrates this is when a captionist went into a classroom only to learn that a video would be shown. The captionist knew she could not caption all the dialogue for the video. She asked the instructor what his goal was in showing the video. The instructor stated that he wanted the students to focus on the sound effects. This changed the approach the captionist took in captioning the video. The result was that the student was able to follow the subsequent discussion and participate fully. Had the captionist not had this overall goal to follow, she would have tried to summarize the plot and dialogue which would have left the student lost in the later discussion.

A final interpreting model to consider is the Cokely Model. This model provides a very detailed description of how interpreters process information. It can be helpful to show the Cokely chart to individuals who are not familiar with the complexity of meaning-for-meaning services in order to help increase understanding. The Cokely Model also explains various types of miscues that can occur: omissions, additions, substitutions, intrusions, and anomalies. Service providers can avoid these miscues by understand when and how they occur (Cokely, 1992).

Service providers can use these models to help them improve their skills and increase their understanding of the complex mental processes that meaning-for-meaning requires. In addition, service providers should have strong short-term memory, an expansive vocabulary, good comprehension of Standard English, knowledge of cultural and syntactical reference, a broad knowledge base, good summarization skills, and fast typing speed. Exercises to help service providers achieve these skills can be found in *Appendix A*.

A common question which administrators have is how can you analyze a meaning-for-meaning transcript. How can you really know if such transcripts are good, if they express clearly and accurately what the speaker said?

Many people say you can't analyze meaning-for-meaning transcripts because you can't match them word-for-word with what was said. But they can be analyzed, and there are many professions that use meaning-for-meaning translation of information. Those other professions do analyze meaning-for-meaning output regularly.

One of those professions is foreign language interpreting, such as someone translating from Spanish to English. There are idioms and other things to consider that make it so you cannot do a word-for-word translation between different languages. The goal is to take the meaning expressed in the first language, and express that same meaning in the second language, with different words and different grammar.

Work has been done by the National Center for Interpreter Testing, an organization within the University of Arizona, to develop standardized test procedures and to determine if specific meaning-for-meaning foreign language translations done by individuals are complete and accurate. The test, the Federal Court Interpreter Certification Exam, is used to measure the language output of foreign language interpreters, and to qualify them to work in the federal court system.

That meaning-for-meaning testing of foreign language interpreters has been found to be so valid that it is defensible in court. This is one example that shows that analysis of meaning-for-meaning output can be done, and done well. Change from one language to another can be measured.

Another profession that routinely measures the accuracy and completeness of meaning-for-meaning translation is Sign Language Interpreting. The Registry of Interpreters of the Deaf (RID) has developed standards and protocols to determine if the signed output message matches the

message that was spoken. Their certification tests are recognized as valid and reliable, showing again that meaning-for-meaning output can be analyzed and measured.

Another area in which meaning-for-meaning analysis is done in a valid and reliable way is discourse analysis. Researchers look at writers' output and instructors teaching classes to see if the information they are speaking is conveying the intended information accurately. That is a matching of the intended meaning with the actual meaning conveyed. Methods have been developed to reliably judge if the output matches the intended meaning, despite the fact that different words and grammar are used to convey the information from the original source.

Two other groups that have developed and used valid and reliable measurement protocols are the C-Print and Typewell organizations. Both have done quantitative analysis of meaning-for-meaning transcripts in their past certification evaluation programs. By comparing the information in the transcript with the verbatim audio of a lecture, the accuracy and completeness of the information conveyed can be reliably and validly measured.

All of the professions mentioned have in common that they routinely quantitatively analyze meaning-for-meaning output, such as transcripts and signing, to determine if it is "good," if it is faithful to the meaning originally spoken.

The way each of these professions measures the meaning-for-meaning output have several things in common. These include a similar type of source material, a specified unit of analysis, an objective scoring criteria, trained judges using objective criteria reliably, consensus scoring, and a final quantitative outcome measure which is valid and reliable.

In each of the professions' measurement of meaning-for-meaning output, the source material used is authentic and from a representative context. It includes the verbatim words AND context and pragmatics. Pragmatics means the speaker's tone, body language and attitude descriptors. Contextual, non-spoken information, such as interruptions, must also be noted.

By "specified unit of analysis" is meant that the testing protocol defines whether the judges look at the whole discourse level, at sentences, at phrases, at single words. The discourse level was an example mentioned with the Gish Model.

Each system has an objective scoring method. You need judges to do this quantitative analysis, to use the analysis protocol and scoring material and apply them reliably. It takes time to train judges to reach reliable scoring levels.

Each system uses consensus scoring. That was a new idea that came from the work at the University of Arizona, where they developed the method for analyzing the output of foreign language translators. Consensus scoring works like this: Two trained judges both look at a video tape of someone that is translating, or signing; or at a transcript. Each judge notes for each unit of analysis if the information is accurate and representative of what was spoken. For any items that the judges disagree on, they discuss that item and come to an agreement.

When two trained judges look at something they will usually agree on about 85% of it. That leaves about 15% that needs to be discussed, and a consensus reached about each item's acceptability as a meaning-for-meaning representation of what was spoken. The final outcome in each of the professions' measurement systems is a quantitative measure which is valid and reliable.

A lot of work goes into good quantitative analysis. Here are some examples of what must be done, and how long each step of the process takes. For an hour lecture, you are looking at 2-6 hours to prepare the source material. Then it takes over 20 hours of work to identify units of analysis and develop objective scoring criteria. There is a second person involved who is an expert in the same field, usually a professor. Lots of hours are needed, by a couple of people.

Training the judges to do the objective analysis, and then to do the actual analysis takes a long time, many hours. There are two people working and they have to discuss any points of disagreement. They have to refer back to the audio recording and go back and discuss items.

When you add up all the time, from preparing the source material through computing the final objective outcome measure, it can take 38-42 hours to get one hour of lecture analyzed. Some of this time gets spread over many people and the same prepared source material can be used to evaluate many different service providers. But still, the amount of time involved in the whole process can be really daunting.

It is too much time for a supervisor to do: either analyze the work of an already-employed service provider, or judge the work of a service provider one is considering hiring. Thus, the goal that we came up with for this presentation is a quick way to do a meaning-for-meaning analysis procedure.

First, let me give you a little background about kinds of testing. There are two different kinds of analysis: quantitative and qualitative.

Quantitative analysis is a numerical measurement and is expressed in mathematical terms. For example, how many sentences were accurately captured? How many words were spelled correctly? Qualitative analysis is based on generating a description of the qualities of the transcripts, and the "measurement" is expressed in natural language, such as: complete, accurate, easy to read. Are sentences clearly worded? Does the information flow smoothly?

And the transcript should be easy to read quickly. The students are reading in real-time. Things are moving quickly. Their eyes are getting tired. You want it to be easy to read so they can get that information quickly and easily.

Quantitative analysis is very time-consuming and hard to do well and do correctly. Qualitative analysis is easier.

A "quick" way to do a qualitative analysis is this: Get an unedited transcript. If you could sit in the class and listen to the lecture as it happens, that would be great. But for someone looking to hire a service provider, you can just use an unedited transcript from any class or meeting.

Then you need to just sit down and read the transcript deeply. We know the positive side of what we want. We want the information to be complete, factually accurate, and easy to read. Sit down and look for places these positive things are not there; look for problems in a transcript.

Look for any unclearly worded sections, gaps, or jumps in the information flow. You could be reading along and know there's something missing.

Look for fact errors. Some fact errors are just glaring, such as if they have reversed the logic order of something or put in a 'not' when the 'not' is not supposed to be there. You'd mark those sections as problems. Or you'd note sections that are hard to read. You have to get your glasses out. You'd mark those sections as problems.

So, I'll show you a couple of samples of possible problems. Read the examples and see if you can spot the problem.

Problem Sample #1

Advertising is everywhere. I flew to LA this weekend and I was basically on a 4 hour advertisement. The planes have ads painted on them. The flight attendants make announcements to buy the Delta credit card using the sandwiches.

A Fact Error is in the last sentence. Reading the transcript deeply, you'd catch that confused sentence as a fact error. These things happen when you are interpreting and transcribing, especially in a fast moving, dense class or meeting. Things can get mixed up. Often people transpose numbers in a phone number. So, if you are reading a transcript, you look for things like that and you circle them.

Problem Sample #2

The competition between cohesive forces and thermal energy determines if something is a solid, a liquid or a gas. If the thermal energy is a lot less than the cohesive forces, you have a There is only one class of liquid, but there are two classes of solids: crystalline and amorphous.

That segment has obvious gaps and missing information. These are easy to see. Lots of times, though, gaps aren't so obvious. But what happened? What caused those gaps and problems? There might have been noise next to the service provider or something happened and they lost the whole thought. It's just gone. It's not good, but it does happen.

Service providers can ask for repeats, but sometimes you just can't interrupt. However, in the two systems that I know best here, TypeWell and C-Print, the service providers are trained to ask for clarification.

Is this actually a poor transcript? The way I will answer that question is that this is an example of a non-ideal transcript. A service provider should have strategies to use when somebody coughs. I will approach this situation in this manner: we identified some problems, now what do we do with them? Should we kick out the cougher? The service provider might ask for a repeat of the missed comment; or she might move her chair away from the cougher.

Again, you are doing this "quick" qualitative analysis of a transcript. You mark things like this. Some are less obvious. Many of you probably have done observations of interpreters. You have probably seen it where they just lose it. They may look to their team and get filled in, but many times they just need to go on. So, there are very similar kinds of problems or events that cause this to happen in both kinds of services.

Problem Sample #3

Today we'll be working with sentences one more time. Let's look at the syllabus. Now we'll talk about periodic structure. Look at syllabus that words WIP come up again and again. Each day from now on, bring Works In Progress with you. Shift from works reading and interpretation and writes based on that to works generated by you.

The last sentence above is unclearly worded. What is that sentence suppose to mean??!! These kinds of wording errors do happen, and if you are doing an evaluation, as said before, some service

providers are really great and do wonderful jobs. And others, just like in every profession, are not so good.

So this happened to come from a service provider that had problems. What happens when a service provider loses the sense of what's going on? They might just do a "brain dump" and just put words out.

You will see a pattern like that as unclear wording. You don't want that, but if you see it you can help the service provider improve by looking at transcript and then working to improve problem areas.

Problem Sample #4

How many people here have TiVo or have DVR ? Not that many, you are college students on a budget, but a large percentage of people in the United States have this technology, and it will get worst for advertisers. They thought the same thing would happen when DVD came along, and VHS. That television would go away, but it does not, it just adapts and changes. The other thing, advertising is everywhere. I flew to Los Angeles this weekend, I was on a 4 hour commercial from the time I get to the airport. The planes now are painted with advertising, from teams to products. You get on the plane, the flight attendants make announcements, to buy the sandwiches that they do not give away anymore, with the delta credit card, sign up here. Another credit card. I put my tray table down and there is a Microsoft ad right there in my face.

That sample is hard to read quickly. There are no paragraphs for eye relief while reading, or for showing the topic organization. The service provider needs to work on better formatting.

Okay, so the main message for you from all this is that you can do a qualitative analysis of a meaning-for-meaning transcript by just reading it, and looking for unclear wording, gaps, fact errors, and reading ease.

But what if you are looking at a transcript for advanced architectural design class, for example, and you haven't sat in on the class yourself, and you don't know the subject area and you don't know what's a fact or not. Or maybe the information in the transcript seems to jump all over the place. Is it because of the service provider, or is it the class, or is it the instructor?

Here are some ways to solve those mysteries. Ask an "expert" in the topic and/or the class instructor. Instructors often are not available for this review of the notes, but we have had good luck with a top student in the class. You can ask the instructor to recommend someone in the class who really understands the class information and could help the Disability Support Supervisor evaluate the accuracy of the info in the transcript.

Notes from a class notetaker can also be used to see what information was given in the class, and what gaps there may have been. That's a way to see if the gaps are from the service provider or from the professor.

One strategy to see if gaps are due to the professor's style or the service provider's abilities is to get a transcript from that same service provider for a different course or different teacher.

Another way to solve that mystery is to look at the transcript for notations of silent activities. C-Print and TypeWell service providers are trained to note when there's silent activity going on, such

as the class working silently. If there are no notations of silent activity, it means either that the service provider did not note them (but should), or that the class was active, but the service provider missed information and had gaps in the flow.

Remember the “rule of thumb” that a meaning-for-meaning transcript is typically about 8-10 pages for an hour class. If a particular transcript is a lot less than that, or if a particular service provider often has much shorter transcripts from all her classes, you should probably be concerned.

It takes about an hour to do this kind of qualitative analysis, this deep reading and needed "mystery solving." However, it is worth it because the process gives you so much information about individual service providers.

For each of the problems you note in a transcript, give the service provider some of the skill enhancement strategies given for the component skills of being a good service provider. Those will help you help a service provider overcome problems.

You may encounter situations where a service provider has a lot of fact errors, or the transcripts may be hard to read, or other problems noted in the analysis of the transcript. To address these issues, you can look at that analysis you just did, match up the problems with the desired skills, then match up those skills with the strategies suggested, and help the service provider get better.

Meaning-for-meaning is a service which provides students with full access to spoken communication. Understanding how the mental processes work for the service provider and how the transcripts can be analyzed, will help support service coordinators improve services for the students.

References

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Appendix A

Skill Building Exercises

Short-Term Memory Building

- Listen to a practice lecture. Do not begin typing until the third word is spoken. Then increase the lag time to the fifth word, then to the tenth word.
- Listen to a practice lecture tape. Allow it to play for 1 minute and then pause the audio. Type as much of what you hear as you can remember. Slowly increase the amount of time that you listen before pausing to type.

Vocabulary Building

- Subscribe to a *Word of the Day* email group. Each day you can learn a new word. Practice the words but making it a group activity with co-workers. See who can use the word of the day the most times correctly within that day.
<http://dictionary.reference.com/wordoftheday/list/>
- <http://grammar.ccc.commnet.edu/grammar/vocabulary.htm>
- <http://www.english-test.net/gre/vocabulary/meanings/180/gre-test.php>

English Comprehension Skills

- Read a book each month.
- Utilize online grammar exercises.
 - http://www2.actden.com/writ_Den/index.htm
 - http://owl.english.purdue.edu/handouts/general/gl_sentclar.html
 - http://www.collegeboard.com/student/testing/sat/prep_one/improv_sent/pracStart.html

Strong Knowledge of Cultural and Syntactical References from both Hearing and Deaf Culture

- Deaf culture
 - Attend deaf events.
 - Take a sign language class.
 - <http://www.deaf-culture-online.com/index.html>
 - <http://www.aslinfo.com/deafculture.cfm>
- Idioms
 - <http://www.usingenglish.com/reference/idioms/>
 - <http://humanities.byu.edu/elc/student/idioms/idiomsmain.html>
- Colloquialisms
 - http://www.usingenglish.com/links/Slang_and_Colloquialisms/index.html
 - <http://www.word2word.com/slangad.html>

Cultivate a Broad Knowledge Base

- Watch educational programs and keep up with current events.
- Borrow a text book to accompany classes you caption for.
- Discuss with instructors what their goals are for each class session.
- Listen to academic podcasts during your commute.

Strong Summarization Skills

- Record the nightly news or a program from the Discovery Channel or the History Channel. Listen to a short segment (5 minutes or less) and then pause the tape. Summarize the information in a single sentence. Then summarize the same information in 3 sentences and finally a short paragraph. Reword the summarizations until they accurately capture the information in varying degrees of detail.

Fast Typing Speed

- <http://www.typingtest.com>
- <http://www.learn2type.com/TypingTest>

Sources for Practice Lectures

- http://www.apple.com/education/itunesu_mobilelearning/itunesu.html
 - Download iTunes software (free).
 - Go to iTunes Store and choose
- <http://disability411.jinkle.com/>
 - Podcasts on disability related issues.
- http://www.oculture.com/2006/10/university_podc.html

