A study on the amenability of digital pen technology in a hybrid mode of interpreting: *Consec-simul with notes*

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Abstract: This paper focuses on the use of digital pen technology in interpreting practice and research. It seeks to advance the field of interpreter training through the trial of contemporary technology and the possible development of a hybrid mode of interpreting that has attributes of both conventional modes of interpreting – consecutive and simultaneous (hereafter labelled *Consec-simul with notes*) – due to the immediate recording and play-back functions that new digital pen technology offers. This latter development could have applications not only in interpreting performance but also in interpreting training. The article sums up and contextualizes data and analysis from a pilot study on the use of digital pen technology in the hybrid mode of interpreting *Consec-simul with notes*. The study, which measured the quality of performances of four French-English interpreters in two different modes (consecutive and *Consec-simul with notes*) with various indicators, reports a higher level of performance in this mode and invites further research and implementation in training institutions.

Keywords: digital pen technology, interpreting training, modes of interpreting, comparative analysis, interpreting performance.

1. Introduction[1,2]

Most interpreters tend to find consecutive interpreting assignments which require the understanding, memorisation and note-taking of a speech rather difficult and stressful. For this reason, performance enhancing technology is a resource welcome by interpreters, especially if technology is available to reduce the strain on short-term memory retention (the memory in action between the moment a speech is heard and notes representing it taken). Technology-assisted interpreting has long been of particular interest to trainers, practitioners and students seeking to find ways of integrating technological applications to assist them in their everyday professional life.

In 1999, Michele Ferrari, a European Commission interpreter, was the first professional interpreter to employ digital technology by recording the source speech of a commissioner, then playing it back from his digital recording device, and interpreting it simultaneously. For the first time, a

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[1] Permission to conduct research on informants for this paper was granted by the Monash University Human Research Ethics Committee (MUHREC) on 19 April 2011, Proj. No. CF11/0640 – 2011000300. 'Evaluation of digital recording equipment for interpreting training purposes'.
[2] Disclaimer: The author of this article declares hereby that he does not have any commercial relation or partnership with *Livescribe*, the manufacturer of the Smartpen, that he is not the beneficiary of any financial, research or other remuneration from this company. Information provided on the product here reflects the views of the author and not those of the company.

consecutive interpretation was performed simultaneously. In an interview, given in 2002, Ferrari justified his choice:

> I have always felt a sense of dissatisfaction in performing a consecutive, as if it was a constant struggle against impossible odds. Indeed, I firmly believe it is impossible to do a perfect consecutive, when faced with a difficult, dense and fast speech. Even in the best consecutive of this world, there is always a little something missing. [...] This [consecutive interpreting] entails a lack of rigour, which has always troubled me ever since my first consecutive, and which led me to find a better solution, in order to fully respect the speaker's original speech, in all its aspects. (Gomes, 2002, p.5).

This original approach to a "digitally remastered" consecutive interpretation and this new mode triggered lots of interest from researchers and, from then on, several studies were conducted. As indicated in Hamidi and Pöchhacker (2007, p.277-278), various practitioners have trialled different tools to test the efficiency of digital assistance when performing a long consecutive interpretation. For example, Ferrari carried out tests at the DG Interpretation with various devices in 2002 and 2003 (ibid, p.277).

These initial trials were soon followed respectively in 2003 and 2005 by those of John Lombardi and Erik Camayd-Frexas, two American interpreters who found the technique very useful for court interpreting assignments (Lombardi 2003, Camayd-Frexas 2005). In particular, Hamidi completed her Master's thesis on the subject in 2006, carried out a study and collected data on the hybrid simultaneous consecutive mode, also called 'SimConsec'. As cited by Pöchhacker (2012), in his recent ATA conference presentation "Consecutive 2.0", other studies of "the note-based vs. recorder-assisted consecutive" have been conducted since by several master's students: Sienkiewicz in 2010, Hawel in 2010, Richter in 2010, and Hiebl in 2011.

The study by Hiebl is of particular relevance to this article as the student used a Livescribe digital Smartpen to carry out the tests, but a different model to the one used for the study reported in this paper. Since the thesis was written in German, the present author was however not able to read it but was interested in some conclusions reported in English in the abstract of the thesis available on the Internet (Hiebl, 2011, p.2).

As most attempts have shown, and as expressed in Hamidi and Pöchhacker (2007), the new simultaneous consecutive mode allows an "improvement in quality" (p.278) and "is praised for its increased accuracy and completeness" (p.278). Because "note-taking is no longer necessary [which] allows the interpreter to devote more attention to listening and comprehension" (p.278) it "permitted enhanced interpreting performances" and was "considered a viable technique" (p.288), despite some caveats about poor communication with the public. Indeed, even if the abovementioned studies have found an enhanced accuracy and completeness in the interpretations in the new mode, most have also pointed out a poorer audience contact and interaction during the simultaneous part of the task.

This paper will present the results of a small study which compared the interpreting performance of four French-English interpreters who used the conventional consecutive interpreting mode and the new hybridised mode (hereafter labelled *Consec-simul with notes*) with the aid of a digital pen called the Livescribe Smartpen[3], model Pulse™. The paper will focus on the

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[3] This new generation of digital pens, belonging to the category of mobile computing platforms, offers advanced processing power, audio and visual feedback, as well as memory for handwriting capture, audio recording, and additional applications. The *Smartpen* consists of a microphone, a built-in speaker, 3D recording headsets, and an infrared camera. It is used to take notes – it has a normal ink cartridge and is held as a 'normal' pen - and to capture data on micro-chipped paper. Thanks to the built-in microphone and speaker and the infrared

use of digital pen technology in interpreting practice and research. The main differences between this present study and those previously undertaken, and listed above, lie in the equipment used (the interpreters can still take notes), in the language pair, in the experience of the interpreters, and in the choice of variables: accuracy, eye contact, hesitation phenomena and speech flow.

2. The study: *Consec-simul with notes*

Previous experiments and studies conducted in the last ten years to investigate the relevance and viability of the hybrid mode, labelled it or referred to it in different ways, e.g. as "Digitally remastered consecutive" or "Technology assisted consecutive" (Ferrari, 2002), "DRAC – Digital recorder assisted consecutive" (Lombardi, 2003), "Digital voice recorder assisted CI" (Camayd-Frexas, 2005), or "SimConsec" (Hamidi and Pöchhacker, 2007).

I have opted for the term *Consec-simul with notes* (or shortened as *Consec-simul*) to underline the fact that the interpreter still works with a pen and paper, and therefore that notes are still possible. This label also reflects the combination of both modes, consecutive and simultaneous, and the way the interpretation unfolds. The steps involved in consecutive interpreting are: listening, understanding, memorizing and note-taking; and the steps involved in simultaneous interpreting are: listening, understanding and simultaneously expressing the content in the target language.

2.1 Operating processes underpinning *Consec-simul with notes*.
Using Gile's (1995) now familiar Effort Models, by which Gile conceptualizes the interpreting act as a series of efforts to be coordinated and managed to perform well, the operating processes undertaken in the *Consec-simul with notes* mode could be mapped as in the table below:

Phase 1	Listening 1 and analysis 1 Short-term memory operations Note-taking
Phase 2	Listening 2 and analysis 2 Short term memory operations Long term memory operations (reconstructing the speech) Note-reading/Retrieving information/Anticipation/Operating the pen Production

Table 1: Effort Model as applied to the *Consec-simul with notes* mode of interpreting

During phase 1, the effort components are identical to those for a traditional consecutive performance except that the interpreter knows that he/she will hear the speech a second time and interpret it simultaneously, and that he/she will have the possibility of slowing down or speeding up the audio playback with the digital pen. The interpreter is therefore likely to take

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camera, an application synchronizes what is being filmed/recorded as handwriting with the audio recording. Thanks to the paper technology that enables interactive 'live' capture using plain paper printed with microchips, and to a function called Paper Replay, the user of the pen can play back any recording from the notes taken on paper at any time. For a superior comfort in listening, the flow of the audio playback can also be slowed down or sped up as required. Digital pens are currently used in the development of note-taking systems, and are now also being trialled as a means of offering a hybrid mode of interpreting – consecutive *and* simultaneous - by recording source speeches and allowing immediate playback from the notebook into earplugs, offering the interpreter the possibility to give a simultaneous interpretation while listening to the source text for a second time and reading from their notes (Orlando, 2010).

notes in a different way and perhaps focus more on the structure of the speech, or write prompts about the pen features to use at a certain time during the interpretation. This 'anticipatory' knowledge is likely to lead to more economical note-taking, with a focus on the macro-linguistic and structural elements of the speech.

During phase 2, the effort components that are usually required and coordinated in simultaneous interpretation are facilitated by the fact the interpreter hears the content of the speech for the second time. This 'recently-acquired familiarity' with the content, coupled with specific notes the interpreter may have taken, should facilitate management of the extra load that the added coordination and management of operations may bring (e.g. anticipation, re-reading and matching notes from the first hearing, using other functions of the pen, such as slowing down or speeding up the playback).

2.2 Aims of the study.

The study aimed at comparing interpreting performances delivered in two different modes, namely the "traditional" consecutive mode and the new dual hybrid mode, *Consec-simul with notes,* whereby the interpreter can perform from their notes as well as from playing back the recorded source speech. It specifically focussed on comparing the interpreting performance of four professional interpreters (working in the English-French pair) on the basis of accuracy, source-target correspondence and fluency.

The study also aimed at measuring the level of communication or interaction interpreters have with their audience when interpreting in one mode or the other. Participants were informed of this aim and were asked to consider the two other people in the room and the camera as their 'audience' during their interpretations. This is an important point to underline, since we wanted to see if these interpreters would attempt to improve the 'lack of eye contact' aspect. If so, this might suggest that if being told, or even trained, interpreters might be able to 'control' what appears as a drawback in the use of such technology, and be more natural and communicative.

The viability of the hybrid mode using the digital pen in the profession was also tested. The focus was therefore put on the interpreters' perspective about the use of the *Consec-simul with notes* mode with the Smartpen, in a real life situation, to determine if they would consider using the tool in their future practice.

In her study (2011), Hiebl concluded that the "findings are not sufficient to emphasize the usefulness of the simultaneous-consecutive interpreting technique in the field of interpreting. There is still some research to be conducted in the future, taking into account the two key features 'practising' and 'improvement of the sound quality'" (p.2). A further objective of the present study was therefore to check if the participants would convey the same impressions as those in the Hiebl's study.

2.3 Study's methodology.

Our study was conducted in July 2012, at Monash University, in the Translation and Interpreting Studies department.

2.3.1 The participants. Four interpreters (three women, one man) with similar language combinations (French A, English B), who had recently graduated from Monash University's T&I programme were recruited as volunteers to undertake the experiment. Despite the small number of participants, the profile of interpreters was consistent for the study inasmuch as they were four 'junior' interpreters with between 1 and 3 years of experience, and were all graduates of the Master in Interpreting and Translation Studies at Monash University and the recipients of a training

based largely on consecutive interpreting and less on simultaneous interpreting (70% consecutive – 30% simultaneous). During their training, they all had the opportunity to use the Livescribe Smartpen in note-taking training activities (Orlando, 2010). All participants are interpreters who have passed the test requirements of the Australian National Accreditation Authority for Translators and Interpreters (NAATI) to be accredited as Professional interpreters.

2.3.2 The equipment. The equipment used for the *Consec-simul with notes* performance was the digital pen Livescribe Smartpen, model Pulse™, and an A5 Livescribe notebook of micro-chipped paper. The choice of the Pulse™ model is important as this first generation model comes with a 3D recorder ear set which is an essential feature during the playback of the original recorded speech as this specific ear set is a guarantee of a high quality sound.

2.3.3 The texts. The experiment was conducted in the English-French pair and the analysis was made on the interpretations of speeches delivered in English and interpreted into French.

The texts used for the study comprised speeches that were similar in terms of topic, length and density of information. Both speeches had been previously video-recorded from a delivery by the same English native speaker. The table below shows the characteristics of the texts used.

	Topic	Number of words	Number of sentences	Density of information (measured in number of "units of meaning" – see 3.1 below)
Text 1	Transatlantic relations (EU/USA)	786	42	125
Text 2	French-US relations	797	39	122

Table 2: Data on the texts used for the study

2.3.4 The procedure. Once the participants were recruited, they were individually invited to attend the experiment session in one of the university's tutorial room, over a two-hour period.
Upon arrival, the objectives of the study were explained to the participants as follows: "Our aim is to test the validity of the use of digital pen technology in the *Consec-simul with notes* mode compared to the conventional consecutive one. Previous comparative studies have shown better accuracy but a lack of eye contact in the hybrid mode of interpreting; therefore the experiment will also aim at checking the accuracy of the interpretation in both modes and also the eye contact instances with your audience".

The 'audience' of the experiment was composed of the present author and an assistant, standing in two different spots in the room: one behind the camera, the other in the middle of the room.

Before starting the actual experiment, the interpreters were given half an hour to get used to the pen functions, and were also given the opportunity to interpret in *Consec-simul* from another speech, of similar topic and length. Attention was paid in particular to the possibility to accelerate or to slow down the playback of the recording, should some passages of the source speech be too slow or too fast.

Each video-recorded source speech in English was played without pause to the interpreter who then had to interpret it into French. Interpretations were all video-recorded.

Speech 1 was played to the interpreter and delivered over 6 minutes and 51 seconds (119 words per minute) and was interpreted in the traditional

consecutive mode. To avoid fatigue impacting the second interpretation, interpreters were given a 15 minute break between both interpretations. Then the recording of speech 2 was delivered over 7 minutes and 2 seconds (114 words per minute) and was interpreted in *Consec-simul* using the Pulse™ Livescribe digital pen.

After the experiment, participants were asked to stay in the room to fill in a questionnaire about their impressions and feelings.

3. Method of analysis

After the experiment, the features of the interpreted performances (accuracy, eye contact instances, hesitation phenomena and duration and speed of speeches) were measured and analysed from the objective factors captured on the videos by two persons, the present author and a trained research assistant.

3.1 Units of meaning
To measure the performance of the interpreters in terms of accuracy in each mode, each sentence of each speech was chunked in different "units of meaning" (Seleskovitch, 1989), representing facts and ideas which were then aggregated.

The total of units for Speech 1, to be interpreted in the traditional consecutive mode, was 125 units. The total for speech 2, to be interpreted in the hybrid mode, was 122 units. Each recorded interpretation was then transcribed orthographically (with the hesitations reported) and compared to the source speech, with the different units of meaning counted down, for each interpreter, in each mode of interpreting. The data was then turned into percentages. (e.g. 80 units conveyed in speech 1 represented 64% of the total of 125 units of meaning).

The measurement consisted in checking the number of units of meaning understood by the interpreters and rendered fully in their performance. The way the rendition was phrased and its effect on an audience were not measured.

> Example:
> In order to soften France's image abroad, Nicolas Sarkozy pledged to do more to combat AIDS and help Africa in a big speech delivered recently in New York.

In the above sentence, taken from one of the speeches, the units of meaning to be identified by the interpreter would be: 1) Nicolas Sarkozy, 2) in a speech in NY, 3) promised to increase fight on AIDS, 4) and help Africa, 5) to soften the image of France, 6) abroad. This amounts to 6 units.

3.2 Eye contact instances
As an indication of how communicative each interpreter was in each mode, each eye contact instance with members of the audience was reported, according to the fact they were short or long, i.e. more or less than 1.5 second.

Research in oculesics (the elements of kinesics dedicated to eye-related nonverbal communication) has shown that eye contact instances in a public-speaking situation indicate more or less interest, attention and involvement with the audience (Beebe, 1974). Studies on gaze (length of gaze, frequency of glances, patterns of fixation) have indicated that speakers usually assign a more frequent and longer glance to the audience when they know their topic well, and that an increase in the length amount of eye contact generated by a

speaker significantly increases the speaker's credibility (Gu and Badler 2006, Beebe 1974).

During the interpreting performance, shorter eye contact occurrences seem to indicate simply the acknowledgement of the communication situation and the interpreter's awareness of an audience to connect with. Longer eye contact occurrences seem to indicate the interpreter is engaging more deeply with the recipients of the interpretation and is speaking directly to members of the audience.

3.3 Hesitation phenomena

The measurement of hesitation phenomena was done by counting the number of pauses, hesitations, false starts, etc, for each interpreter in each mode. Measuring these would indicate if there are more occurrences in one mode or another which would affect the fluency of the interpretation.

"Disfluencies" as Garnham called them, such as "hesitations, pauses, ums and ahs, corrections, false starts, repetitions, interjections, stuttering and slips of the tongue" (Garnham, 1985, p.206), have an impact on the fluency of the interpretation as they indicate hesitations in understanding the content, in retrieving the meaning of words or symbols noted down, in finding the right syntactical construction in the target production, but also nervous tension on the part of the interpreter.

Goffman considers these "linguistically detectable faults" or "influencies" (1981, p.172) as manifestations of the efforts of reasoning and formulation which accompany linguistic production. As summarized by Mead (2000), for Goffman the skill of professional speakers, such as the university lecturer or the radio announcer, is to control output in such a way as to hide these efforts and any hesitations they may entail. No "production crisis" or "backstage considerations" (p. 91), are allowed to betray moments of doubt or distraction. The speaker thus maintains control of any hesitations which could surface as "linguistically detectable faults". As Mead indicates (2000, p.91), "Goffman's discussion provides an interesting theoretical basis for evaluation of fluency. Given that interpreters can to all intents and purposes be considered professional speakers, the definition of fluency by default (i.e. absence of influencies) can also prove relevant to evaluation of interpreting."

3.4 Duration and flow speed of interpretations

Duration of target speeches and flow speed were a relevant element to measure as differences between both modes may be revealed at this level too. In comparing the two modes, we wanted to see if interpretations in the hybrid mode would be longer than the source speech, in particular if interpreters decided to use the slow down feature of the play back the digital pen offers.

Usually interpreters are trained in consecutive interpreting along the recommendation that the interpretation should be briefer than the original (Herbert, 1952, p.67-68), even if some leeway in the structure and content of the interpretation and/or some linguistic requirements may lengthen the production sometimes. In contrast, in simultaneous interpreting, the output generally follows more closely the source speech and the interpretation is expected to be as long as the original. In testing the viability of the new mode and the potentially better production in this mode, it was also pertinent to measure the duration and the word output in relation to the flow speed. To do so, each performance was timed and the total number of words was divided by the total duration of each speech. Interpreters indicated in the questionnaire if they used the slow-down feature or not.

3.5 Questionnaire to participants
Finally, to collect participants' perspective on the mode and the potential use of the technology in professional practice, a questionnaire was distributed at the end of the experiment. It consisted of nine open-ended questions and was presented to participants after their performance in the *Consec-simul* mode (see table 4 below).

4. Results and discussion

The following figures present and sum up the results for each interpreter's performance in each mode. They include the overall accuracy for each speech and each interpreter, the number of short and long eye contact instances, the occurrences of hesitation phenomena, and the duration and speed of each target speech.

4.1 Accuracy – Rendition of units of meaning
As stated in 3.1, the accuracy of interpretations was calculated based on units of meaning being conveyed in the interpretation.

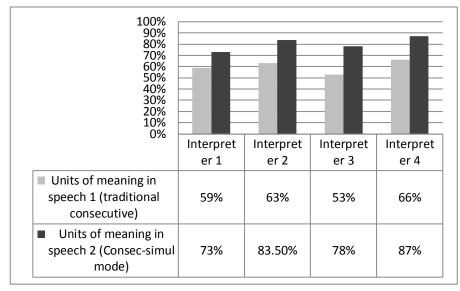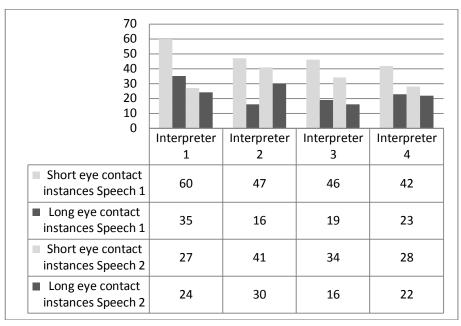|	Interpreter 1	Interpreter 2	Interpreter 3	Interpreter 4
▇ Units of meaning in speech 1 (traditional consecutive)	59%	63%	53%	66%
■ Units of meaning in speech 2 (Consec-simul mode)	73%	83.50%	78%	87%

Figure 1: Comparative presentation of units of meaning rendered in informants' interpretations in both modes
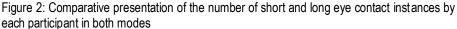
As figure 1 above indicates, rendered accuracy is higher in each interpretation in the *Consec-simul* mode for each interpreter. This matches and confirms what previous studies on technology-assisted consecutive interpreting have shown (Lombardi 2003, Vivas 2003, Camayd-Frexas 2005, Hamidi and Pöchhacker 2007, Hiebl 2011). As shown in the figure, in the hybrid mode the lowest performer rendered 73% of the units of meaning contained in the original speech content and the best 87%. In traditional consecutive, the lowest score was 53% and the best 66%. The difference is substantial. It is also relevant to note that the lowest score in *Consec-simul* is higher than the highest score in traditional consecutive. The collected data shows that when interpreting in the hybrid mode, the interpreters were more accurate and rendered more source information than in the conventional consecutive mode.

4.2 Eye contact instances
As explained above, the interpreters were told that in previous comparative studies, results had shown a lack of contact with the listeners in the

technology assisted mode. Figure 2 below sets out participants' instances of long and short eye contact with their 'audience'.

	Interpreter 1	Interpreter 2	Interpreter 3	Interpreter 4
▢ Short eye contact instances Speech 1	60	47	46	42
▪ Long eye contact instances Speech 1	35	16	19	23
▢ Short eye contact instances Speech 2	27	41	34	28
▪ Long eye contact instances Speech 2	24	30	16	22

Figure 2: Comparative presentation of the number of short and long eye contact instances by each participant in both modes

Depending on the mode of interpreting, the interaction between the interpreter and the audience differs. "Simultaneous interpreting means tighter time constraints during production" (Mead, 2012, p.181) and may not provide enough room to naturally connect with the audience, whereas for an interpretation in the consecutive mode, the interpreter is the one who sets the pace during the production phase and can devote more attention to monitoring his/her output than in simultaneous as part of the Production Effort (Gile, 2001). Also, simultaneous interpreting is generally conveyed from a booth or in *chuchotage* and interpreters do not generally have to establish eye contact with the listeners. Consequently, one would naturally expect better interaction and more communication in the consecutive mode and indeed, as figure 2 above shows, more eye contact instances overall occurred in the traditional consecutive interpretations (total overall 288 vs. 223).

The data however shows that interpreters acknowledged the presence of their audience and interacted with their listeners also in the hybrid mode. Three interpreters out of four had more eye contact with the audience in the traditional mode, but Interpreter 2 had actually more eye contact overall in the second speech than during the first.

What is interesting to note too is that the differential ratio 'long consistent eye contact/short eye contact instances' is lesser in the *Consec-simul* mode than in traditional consecutive: 60-35 vs. 27-24 for Interpreter 1; 47-16 vs. 41-30 for Interpreter 2; 46-19 vs. 34-16 for Interpreter 3; and 42-23 vs. 28-22 for Interpreter 4. In contrast to what some of the earlier comparative studies revealed, there is little evidence here of a uniformly lower interaction in the hybrid mode. In fact, all interpreters maintained eye contact with the audience, with a steady number of long ones in the second speech (with Interpreter 2 having twice as many instances of long eye contact with the audience in the second speech).

Considering the above-mentioned research in oculesics (Gu and Badler 2006, Beebe 1974), we can assume that the longer the eye contact, the more engaged interpreters are with the audience, the greater their assuredness in delivery and the deeper their command of the speech must be.

If this communicative behaviour in the simultaneous part of the task is linked with the fact that they were alerted to the issue beforehand, this may indicate that with a certain degree of awareness, and even more importantly, with training, interpreters may be perfectly able to stay well connected with their audience and appear natural, even when providing the simultaneous interpretation. The fact that interpreters hear the speech for the second time when interpreting in this mode must also facilitate this capacity to communicate naturally.

Conversely, the question needs to be posed whether the number of short eye contact instances reflects the interpreter's nervousness and lack of command of the speech. In the case of Interpreter 1, the high number of short eye contact instances in speech 1 may be correlated to the high number of hesitation phenomena shown below in Figure 3.

It is interesting to note from the videos that, in the *Consec-simul* mode, the four interpreters appear to have needed a few sentences to 'find their feet', to be at ease and to start looking at the public. This was probably the time needed by each interpreter to switch to the simultaneous mode and to adapt to the source text pace, and perhaps also to remember that they somehow 'had to' establish eye contact. However, after a few sentences, they all managed to engage with the audience. Two of them even said it was easier to establish contact with the audience during the *Consec-simul* interpretation, a statement which is actually not backed by the above chart, as the instances of eye contact they had in this mode does not significantly differ from those of the other interpreters.

4.3 Hesitation phenomena/disfluencies

As explained in 3.3, the number of occurrences of hesitations (false starts, unfilled pauses, filled pauses with instances of "ers, ums, ahs", repetitions, redirections) was noted down and reported in the transcription of each individual performance in each mode.
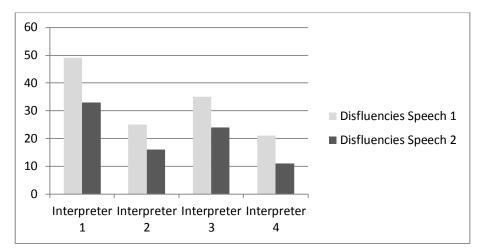

Figure 3: Comparative presentation of the number of disfluencies for each informant in both modes

Figure 3 above shows that 'disfluencies' are more frequent in the traditional consecutive than in the *Consec-simul* mode, and for all interpreters. This is not surprising as the effort required in consecutive interpreting to read notes, to retrieve meaning and logical structure of the ST, and to make a decision on the best reformulation, may often lead to more hesitations in the production phase than in the simultaneous mode where the interpreter follows the flow and pace of the speaker. Gile (1995) puts forward the argument that simultaneity [of listening and speaking] can sometimes make semantic and syntactic choices easier for the interpreter.

Based on the observations during the experiment and during the analysis of the video recorded data, and on Mead's aforementioned comments regarding evaluation of interpreting performances (see 3.3 above), fewer disfluencies are unsurprisingly indicative of better fluency in the delivery/production. This is an important point in the comparison of the two modes because, as Mead (2000, p.90) also points out, "surveys among interpreters and conference participants confirm the importance of fluency as a determinant of quality in interpreting". And quoting Altman (1994) he also indicates that "fluency […] is the one single aspect of an interpretation which most palpably distinguishes a professional performance from that of a trainee".

When linked with the data concerning accuracy (Figure 1) and the different ratio of instances of long/short eye contact in the hybrid mode (Figure 2), the above-mentioned ideas seem to suggest that during an interpretation in the *Consec-simul with notes* mode a higher level of accuracy (comprehension and rendition of the source text) may co-occur with greater fluency (less disfluencies) of the delivery and superior communication with the public (more consistent eye contact instances). And this may allow a professional performance and service of a better quality. Should this be backed up by further studies on a larger scale, the impact of the use of digital pen technology on interpreting pedagogy and training could be of wide-ranging importance.

4.4 Speech duration and flow speed

The table below gives the reader an idea of the length of the speeches and of the speed of delivery of interpretations in each mode in comparison with the source text, and shows if opting for one mode or the other would have consequences in this respect. It also indicates if the interpreter used the slow-down feature of the Smartpen when interpreting in *Consec-simul with notes*.

	Speech 1: 6 min 51 781 words (119wpm)	Speech 2 : 7 min 01 797 words (114wpm)	Use of the Smartpen slow-down feature
Interpreter 1	7 min 34 837 words (114wpm)	7 min 08 772 words (109wpm)	No
Interpreter 2	6 min 39 808 words (126wpm)	7 min 21 865 words (119wpm)	Yes
Interpreter 3	6 min 13 726 words (118wpm)	7 min 32 826 words (112wpm)	Yes
Interpreter 4	6 min 22 717 words (115wpm)	7 min 22 787 words (109wpm)	Yes

Table 3: Length and flow speed for each interpretation compared to each source speech (The data presented in this table is crude in the sense that disfluencies were not deducted)

The general immediately visible conclusion is that interpretations were nearly all of the same length as the source text and delivered in a narrow range of speed (109wpm to 126wpm). There is therefore no real blatant difference or particular conclusion to draw about each mode. Three consecutive interpretations were slightly shorter than the original, as could be expected. All interpretations in the hybrid mode were approximately the same length as the original, even when the interpreters used the slow-down feature of the pen. It seems reasonable to say that, should interpreters decide to work in *Consec-simul with notes*, they are likely to provide an interpretation of approximately the same length as the original speech, and not much longer, as might be feared by some.

4.5 Participants' views

One of the aims of the experiment was to study the amenability of the digital pen technology from the interpreters' point of view and to see if these professionals would consider using it in their practice. The table below sums up the answers of the four participants.

	Interpreter 1	Interpreter 2	Interpreter 3	Interpreter 4
1. Were the two source speeches you were given comparable and similar? If not, what were the major differences?	More data in speech 2	Both the same	Both the same	Both the same
2. In Consec-simul with notes, was the Smartpen easy to use?	Yes	Yes	Yes	Yes
3. Knowing that when interpreting in the Consec-simul with notes you would hear the speech a second time, were your notes different to the conventional consecutive?	Yes, I was less stressed and took fewer notes and listened more actively.	Yes, I took fewer notes	Yes, I took fewer notes	Yes, I took fewer notes
4. Which interpretation did you feel you performed better at, the conventional consecutive or the Consec-simul with notes?	My performance was better in the *Consec-simul* mode	My performance was better in the conventional consecutive mode	My performance was better in the *Consec-simul* mode	My performance was better in the *Consec-simul* mode
5. In which mode was your level of confidence of delivery higher?	*Consec-simul* mode	*Consec-simul* mode	*Consec-simul* mode	*Consec-simul* mode
6. Did you feel you communicated with the 'audience' in the same way when interpreting in the Consec-simul with notes?	It was easier to engage with the audience in the *Consec-simul* mode.	I was distracted by the listening of the speech in *Consec-simul*.	I was distracted by the listening of the speech in *Consec-simul*.	It was easier to engage with the audience in the *Consec-simul* mode.
7. Did you prefer interpreting in the conventional consecutive mode or in Consec-simul with notes?	*Consec-simul with notes*	*Consec-simul with notes*	*Consec-simul with notes*	*Consec-simul with notes*
8. Knowing that in simultaneous interpreting interpreters have less control over the speed, did you or were you tempted to use the 'slowing down' function offered by the Smartpen?	Yes, I was tempted, but I did not use it as there was too much going on to do so.	Yes, I was and I used the 'slow-down' function.	Yes, I was and I used the 'slow-down' function.	Yes, I was and I used the 'slow-down' function.
9. Would you consider using the Consec-simul with notes mode in the future?	Yes	Yes	Yes	Yes

Table 4: Comparative responses from participants to questions on their perceptions of the experiment and their own performance in both modes.

When asked how they felt about the use of the pen, the four interpreters agreed that if they received more training in the use of its digital features, it would be a helpful tool, allowing them to relax and rely on a second listening, their notes and their memory. They pointed out that they would take fewer or different notes, and use the 'slow down' feature for difficult passages. The four participants mentioned that in the hybrid mode, they took fewer notes than usually. The study did not focus on the type of notes taken by interpreters even if, in this experiment, participants were using pen and paper and notes during both interpreting performances. Further investigation of the type of notes taken when working in *Consec-simul with notes* would certainly be of interest and this will be addressed in the next phase of the research carried out by the present author on this mode of interpreting.

The interpreters questioned in Hiebl's study (2011) were at best sceptical about the use of the digital pen in professional practice, and stated that they all preferred interpreting in the traditional consecutive mode. In contrast, these four interpreters expressed their preference in interpreting in the *Consec-simul with notes* mode and would consider using the Smartpen in the future. They all stated their higher confidence when interpreting in the hybrid mode as well as their feeling of a better performance. It is difficult to comment upon differences in perception from one study to another. The fact the interpreters chosen for this experiment were 'junior' interpreters may also influence their perception. Their short experience may be conducive to adapting to a new mode using new digital technology. More experienced professionals may be more reluctant to change their working habits. Further research with a larger group of interpreters would be interesting to draw relevant conclusions on the preferred mode.

Hiebl's study (2011), which also used a Livescribe Smartpen, reported a sound quality issue. The reason was that the Echo™ model used in that study was not equipped with the external plugged-in 3D ear set and relied only on the built-in microphone. None of the four interpreters in this sample has mentioned sound quality disturbances with the 3D recording ear set provided with the Livescribe Smartpen, model Pulse™. The use of this 3D recorder ear set is therefore recommended when conducting further studies on the *Consec-simul with notes* mode.

5. Conclusion

The aims of this study were to compare interpretations in two different interpreting modes: traditional consecutive and *Consec-simul with notes*, and to test the viability of digital pen technology as a tool to assist in the production in the second mode. Data was analysed to compare levels of accuracy and fluency in each mode, as well as eye contact with the audience, and to see if the results would be similar to those revealed by previous studies on this hybrid mode. The focus was also put on the interpreters' views of the mode and of such technology.

As in past experiments on simultaneous consecutive interpretations, this study shows much higher accuracy in the interpretation when the interpreter uses the digital pen technology. Interpretations with this tool and in the hybrid mode show a range of accuracy going from 73% to 87%, whereas the range is 53% to 66% in the traditional consecutive (Figure 1). A possible explanation for the low range in the traditional consecutive mode may be the lack of experience of these 'junior' interpreters, and future research with more experienced professionals should provide better insights on the subject. In this study, the same source speech was always used in the same mode. To ensure a more balanced comparability in future studies, one might however recommend switching texts to avoid any bias.

As for the communicative aspect of the performance, results in this study did not show a clear-cut difference between the two modes. Less eye contact instances with the audience were indeed noted in the *Consec-simul with notes* mode but the ratio difference between short eye contact and long eye contact instances is not particularly high in the hybrid mode. This may suggest that even if the simultaneous mode allows less natural contact with the audience, the interpreter is still able to interact and establish eye contact. The fact that the participants were informed before the experiment that this had been an issue in previous studies, and that this factor would again be analysed, may have influenced the results. This is actually a good thing, as this proves that awareness of this issue may help to improve the communication situation. Should training institutions train their interpreters to work in such a mode, this aspect would be addressed through systematic of practice.

As far as the fluency of interpretations in each mode is concerned, data shows that the number of disfluencies or hesitation phenomena is lesser in the hybrid mode. This seems to indicate that interpretations in this mode will show less tension, less lack of understanding, less difficulty in retrieving meaning from notes or in producing the target speech, and should therefore be more fluent and more professional.

The speech length and the speed delivery data seem to show that in the hybrid mode interpretations would be either the same length or just slightly longer than the original, and that thanks to the 'slow down' feature offered by the pen, interpretations may be delivered at a lower speed too.

The interpreters in this sample all declared that they felt more confident in the *Consec-simul with notes* mode, that they provided a better performance, and that they preferred interpreting in this mode. All also added they would use it in future professional settings, provided they engage in or invest in more (self-) directed training with the digital pen and its features. All participants indicated that they took fewer or different notes when interpreting in the hybrid mode. Investigations on the note-taking conventions of interpreters when working in this mode should be encouraged as they would certainly open new doors for both interpreting training and practice.

The number of participants tested in this study is small and the approach of qualitatively-based analysis provides detailed descriptions of their performance. The small size of this sample disallows any claim that this sample is representative of the experiences and attitudes of all trainee or recently-graduated interpreters. However, the four interpreters' responses present some comparability insofar as they had all completed their training in the same institution and had received their interpreter education mainly in the consecutive mode; they all had between one and three years of experience; they had all used the Smartpen on an occasional basis for note-taking during their training. A research project on a larger scale would be useful to add to the small but growing bank of findings on this topic.

The results of this study are promising insofar as the use of digital pen technology in the hybrid mode of interpreting *Consec-simul with notes* seems to indicate a better quality of performances and a better comfort in performing. Further research should be encouraged to gather more evidence of this and to motivate training programmes to introduce the technology in their curricula, with the aim of both facilitating the work of interpreters and improving the service to end-users who expect high quality in the performances of professionals. If this mode of interpreting received the official recognition it deserves in training institutions and in practice, it could become a "new paradigm" for consecutive interpreting, as Ferrari stated in 2002 regarding the 'digitally remastered consecutive'. (Gomes, 2002, p. 6).

References

Beebe, S.A. (1974). Eye contact: A nonverbal determinant of speaker credibility. *The Speech Teacher*, *23*(1), 21-25.

Camayd-Freixas, E. (2005). A Revolution in Consecutive Interpretation: Digital Voice-Recorder-Assisted CI. *The ATA Chronicle 34*, 40-46.

Ferrari, M. (2002). Traditional vs. 'simultaneous consecutive'. *SCIC News, 29*, 6-7. Retrieved from http://scic.cec.eu.int/scicnews/2002/020130/default_29.htm

Ferrari, M. and Hamidi, M. (2007). Simultaneous consecutive revisited. *SCIC News, 124*(February 2007). Retrieved from http://iacovoni.files.wordpress.com/2009/01/simultaneousconsecutive-2.pdf

Garnham A. (1985). *Psycholinguistics: Central Topics*. London-New York: Routledge.

Gile, D. (1995). *Basic Concepts and Models for Interpreter and Translator Training*. Amsterdam/Philadelphia: John Benjamins.

Gile, D. (2001). The role of consecutive in interpreter training: a cognitive view. *Communicate!* (September-October 2001). Retrieved from http://aiic.net/page/377/the-role-of-consecutive-in-interpreter-training-a-cognitive-view/lang/1

Goffman E. (1981). *Forms of Talk*. Philadelphia: University of Pennsylvania Press.

Gomes, M. (2002). Digitally mastered consecutive. An interview with Michele Ferrari. *Lingua franca, 5*(6), 6-10. Retrieved from http://www.europarl.europa.eu/interp/online/lf99_one/v05_no6/page2.html

Gu, E., & Badler, N.I. (2006). Visual attention and eye gaze during multiparty conversations with distractions. *Intelligent Virtual Agents, Lecture Notes in Computer Science*, *4133*, 193-204.

Hamidi, M. (2006). *Simultanes Konsekutivdolmetschen. Ein experimenteller Vergleich im Sprachenpaar Französisch-Deutsch*. (MA thesis, University of Vienna).

Hamidi, M., & Pöchhacker, F. (2007). Simultaneous consecutive interpreting: a new technique put to the test. *Meta: Translator's Journal*, *52*(2), 276-289.

Herbert, J. (1952/1980). *Manuel de l'interprète*. Genève: Librairie de l'Université Georg.

Hiebl, B. (2011) *Simultanes Konsekutivdolmetschen mit dem LivescribeTM EchoTM Smartpen*. (Masterarbeit, Universität Wien). Retrieved from http://othes.univie.ac.at/14608/

Lombardi, J. (2003). DRAC Interpreting: Coming Soon To A Courthouse Near You? *Proteus, 12*(2), 7-9. Retrieved from http://www.najit.org/proteus/PDFVersions/Proteus_Spr03%20web.pdf

Mead, P. (2000). Control of pauses by trainee interpreters in their A and B languages. EUT – Edizioni, Università di Trieste. Retrieved from http://hdl.handle.net/10077/2451

Mead, P. (2012). Consecutive Interpreting at a Literature Festival. In Cynthia J. Kellett Bidoli (Ed.), *Interpreting across Genres: Multiple Research Perspectives* (pp. 171-183). Trieste: EUT Edizioni, Università di Trieste,

Orlando, M. (2010). Digital Pen Technology and Consecutive Interpreting: Another Dimension in Note-Taking Training and Assessment. *The Interpreters' Newsletter*, *15*, 71-86.

Pöchhacker, F. (2012). *Consecutive 2.0*. Presented at the 53rd annual conference of the ATA, San Diego, California, 2012.

Seleskovitch, D., & Lederer, M. (1989). *Pédagogie raisonnée de l'interprétation*. Brussels-Luxembourg: OPOCE/ Didier Erudition.

Vivas, J. (2003). Simultaneous Consecutive: Report on the comparison session of June 11, 2003. *SCIC B4/JV D2003*. Brussels: European Commission, Joint Interpreting and Service.