

# *The use of Built-in Digital Backchannels in Professional Communication within Academic Conferences in Virtual Worlds: A comparison With the Use of Twitter in Real Life conferences*

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**Abstract - *This paper deals with the use of built-in digital backchannels within academic conferences in three dimensional virtual worlds (VW) and combines qualitative and quantitative methods to answer the following research questions: does the use of built-in digital backchannels enhance communication, collaboration and knowledge expansion amongst participants in professional communication academic conferences within VW? How can those benefits be articulated? And how does communication in built-in digital backchannels in VW conferences compare to communication through Twitter in real life conferences?***

***This paper builds upon authors' previous research in which, through purely qualitative methods, six distinct categories of learning were identified and provided insights on how participants should behave in a socially acceptable way in such virtual conferences, as well as on how VW presentations were received by members of the audience [1]***

## INTRODUCTION

From literature we know that attending academic conferences is important for scholars, especially to meet others who share common interests [2]. VW are often used as alternative social professional communication spaces or for academic or professional conferences [3][4], as they are cheaper to organize and to attend, yet provide truly engaging experiences to participants [5]. This type of meeting and conference platform had lost momentum in the past few years, due to cumbersome user interfaces, such the VW of Second Life's interface, heavily criticized by researchers [6][7][8][9][10], or to the need for participants to own up-market computers, with elaborate graphic cards,

to access such VWs. Yet, this type of meeting and conference platforms is set to gain in popularity soon, with on one hand the possibility now provided to users to access these VWs with lower end computers, thanks to streaming services like Onlive [11], which enables for example to access Second Life on any low end computer, through the SLgo service [12]. On the other hand, the gain in popularity might come from the arrival on the market of Virtual Reality (VR) headsets improving the users' immersive experience [13], such as the Oculus Rift [14], recently purchased by Facebook for 2 billion dollars, to be positioned as an immersive VR enabler [15][16], or the Sony Morpheus VR headset, announced at the Gamers Developers' Conference this year in San Francisco [17] or also the Avegant Glyph [18] or other such devices.

Yet, the formal presentations that take place in all kinds of conferences, present the challenge that there is a single focus of attention on the presenter [19][20][21][22]. There is very limited interaction with and among the participants, resulting in very few questions being asked and scarce feedback from the audience [21][22]. In recent years, new communication platforms have appeared: microblogging platforms such as Twitter provide what has been labeled "digital backchannels" [23], enabling members of the audience to communicate with presenters, amongst themselves or with the rest of the world. In VW settings, presenters use voice channels to present their speech while they project their slides or videos. These virtual platforms allow participants to share their comments synchronously by typing them in chat, providing them with a truly built-in digital backchannel to interact.

To date, some researchers have studied the use of Twitter at real life conferences [24][25][26][27] and others have studied the use of private digital backchannels in VW

environments, in the context of Multi-User Dungeon / Multi-User Domain (MUD) [28]. In addition, previous research by the authors [1] identified that VW conferences have interaction social codes that are completely different from those common in real life conferences, where much less freedom is allowed. The authors were able to classify these VW conference social codes into the following six learning categories that they called “virtual world’s conferences basics”: technical learning, social codes learning, question session learning, learning about time perception and finally learning about exchanges of information [1]. Yet, few studies have been undertaken to understand in details how built-in digital backchannels are used by and can benefit participants in professional communication academic conferences within VW.

This paper aims at providing this insight and to attempt a comparison between the use of digital backchannels in VW academic conferences and the use of twitter in a real life conference.

#### METHODOLOGY

During an academic conference that took place in March 2012 in the VW of Second Life, we collected all the comments exchanged amongst participants in the built-in digital backchannel during the attended conferences. This amounted to a 208 pages file, totaling 2291 posts resulting in a corpus of a total number of 43291 words. The data was collected by automatically loading, on the hard drive of one of the researchers, all the discussions that took place during 7 sessions and the award ceremony that took place in the VW, over a period of three days. This specific conference was selected based on the criteria that it was an international, virtual, high level conference, gathering academics and professionals and including all the components that are usually met in real life professional or academic conferences: paper presentations, round tables, as well as an award ceremony.

In order to be able to compare the results of our research to previous research on the use of Twitter during real life conferences [26], we adapted our methodology to those used in the twitter related research: various quantitative and qualitative methods were used, including a quantitative examination of user conventions. In order to characterize the type of user intention when posting in the built-in digital backchannel, our ultimate purpose being to compare the use of those channels with the use of Twitter during real life conferences, we had to develop our own categories regardless of what had been found in previous research conducted on Twitter or on other digital backchannels. To do so, we performed a qualitative categorization of the data corpus by open coded content analysis [29] based on grounded theory [30]: each post was read and manually placed into a category representing the apparent intention of each poster, as perceived by the researcher. Further analyses involved the use of text analysis tools (i.e.

AntConc 3.2.4w [31]) and covered the types of words used as well as the frequency of posting and conversations between users.

Validation of the results was ensured through cross member check during the whole analysis process.

#### FINDINGS

Along our analysis, we were able to identify that the way participants interacted during the award ceremony was completely different from the way they did during the more professional conference sessions (presentations and roundtables). We therefore decided to analyze it separately and excluded the award ceremony related data corpus from the rest, thus excluding 905 posts totaling a corpus of 12155 words token.

##### I. Analysis of the awards ceremony

A close look at the digital backchannel exchanges collected for the various sessions showed a big difference between what was said during the awards ceremony and what was said in the other seven (7) sessions. Indeed, by contrast to the rest of the conference, the awards ceremony was mostly a firework of “thank you’s” and congratulations that lasted for 1 hour and 43 minutes and generated 905 posts. This corresponds to 8.8 posts per minute, a much higher number than in any of the other sessions analyzed. There were also 151 snapshots (pictures taken in the virtual world by participants) taken during the award ceremony.

Given this obvious difference, it was decided to analyze the awards ceremony separately from the other 7 sessions. A qualitative analysis of the in-world digital backchannel exchanges enabled us to identify 3 categories of posts:

- 1) Congratulations: this category includes applaudes, comments, congratulations, expression of feelings and emotes regarding award winners and organizers in general. Here are some examples of such posts:
  - Example 1: [16:17]Avatar A: “Bravo! – Cheers! – Applause!”
  - Example 2: [16:17] Avatar B:” >>> Aaaaaaplllaauuussee !!! <<<<”
  - Example 3: [16:25] Avatar C: “YEEEEEEHAW!!!! GREAT JOB!”
  - Example 4: [16:25] Avatar D: “WHOOOOOOHHOOOOO!! YAY!!!!”
  - Example 5: [17:48] Avatar E claps and cheers.
  - Example 6: [17:05] Avatar F:
    - ?(`.,(‘.,?,.’),.’)?
    - “? ‘.,.? \*A\*P\*P\*L\*A\*U\*S\*E\*?.,.’?”
    - ?(.,.’(.,.’?’`.’,.)`.’,.)?
- 2) Applaudes, comments, congratulation and expression of feelings and emotes regarding specific individuals or groups of individuals

recognized in the ceremony. Here are some examples of such posts:

- Example 7 : [16 :14] Avatar G applauds Avatar H.
- Example 8: [16:16] Avatar I: “Avatar J ROCKS!!”
- Example 9: [16:16] Avatar K: “Yay, volunteers!”
- Example 10: [16:19] Avatar L: “yeaaaaahhhh ©congrats Avatar M!”
- Example 11: [17:08] Avatar N cheers for Avatar O & Avatar P!

3) More rarely, award winners and recognized individuals responded and thanked the organizing committee and the audience for their recognitions. Here are some examples of such posts:

- Example 12: [16:32] Avatar Q: “\*\*\*blushes\*\*\* My pleasure!”
- Example 13: [16:53] Avatar R: “I’m so proud of my students’ who created the projects” [16:53] Avatar R shouts: “THANK YOU”
- Example 14: [17:11] Avatar S: “Yay!” [17:12] Avatar S: “Thank you!”
- Example 15: [17:36] Avatar T: “Thanks to everyone...”

A word count analysis was also separately performed on the in-world digital backchannel exchanges, using AntConc [31], on the corpus of 12155 words that included a total of 2043 word types (distinct words). The original data corpus was lemmatized (grouping together the different inflected forms of a word so they can be analyzed as a single item) to group together similar words based on their normal form [32], which reduced the number of word types to 1882 and finally, words such as avatar names, articles and prepositions were excluded to remain focused on the meaningful words. All verbs and pronouns were kept in the count as they were not considered to be neutral to the analysis. This step further reduced the number of words to 8352 and the number of word types to 1490. Results of the 20 most frequent words in the digital back channel awards ceremony that took place in the VW, are shown in table 1 below.

TABLE 1. COUNT OF 20 MOST FREQUENT WORDS IN AWARD CEREMONY DATA CORPUS.

Rank	Count	Frequency percentage	word
1	255	3,1%	be
2	180	2,2%	take
3	173	2,1%	snapshot
4	149	1,8%	clap
5	133	1,6%	you
6	132	1,6%	applaud
7	105	1,3%	i
8	86	1,0%	pa
9	86	1,0%	shout
10	85	1,0%	thank
11	83	1,0%	yay
12	71	0,9%	deed
13	68	0,8%	cheer
14	68	0,8%	that
15	67	0,8%	for
16	65	0,8%	wc
17	59	0,7%	bravo
18	58	0,7%	all
19	57	0,7%	have
20	54	0,6%	it

45% of the 20 words most frequently encountered in the award ceremony exchanges, are related to celebration and recognition, with “snapshot” (pictures taken), occurring 173 times, “clap”, 149 times, “applaud”, 132 times, “shout”, 86 times, “thank”, 85 times, “yay”, 83 times, “deed” (in the sense of “illustrious action”) 71 times, “cheer”, 68 times and “bravo”, 59 times. All these words are at ranks 3, 4, 6, 9, 10, 11, 12, 13, 17.

## II. Analysis of the seven other sessions

In addition to the awards ceremony, seven (7) other sessions were analyzed in-depth. One took place on the Thursday, which was the first day of the conference. It was a presentation and was numbered T1. Five took place on the Friday. Four of those were presentations and were numbered F1, F2, F4 and F5, and the fifth one was a roundtable and was numbered F3. Lastly, one took place on the Saturday, which was the last day of the conference and was numbered S1.

An analysis of the number of posts per sessions showed a wide discrepancy, ranging from 68 posts in a one hour session, to 313 posts in a 1 hour session. Of course the number of posts is dependent on the attendance of a session, however, these numbers give a feel of the activity going on at each session, regardless of the attendance. The graph below shows the distribution of the number of posts per session:

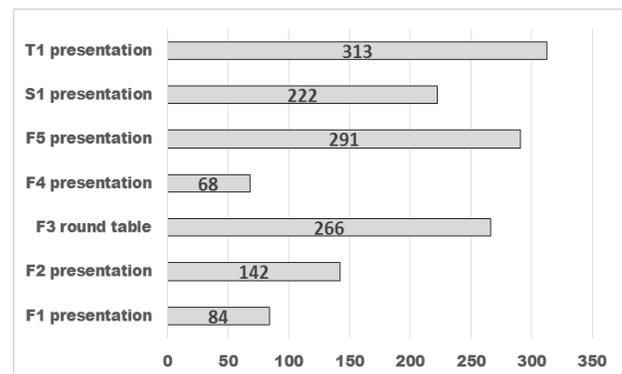


FIGURE 1. NUMBER OF POSTS PER SESSIONS

Our analysis of participant’s posts aiming at understanding user intentions enabled us to identify 8 different categories: 1) comments and feeling related to the presentation, such as for example: “*how to be epic - wear the gear*” 2) sharing sources such as urls, books, etc, such as, for example: “*Avatar U: <--- found Marc Prensky writings... he's got an interesting new paper for Educational Technology <http://www.marcprensky.com/writing/>*” 3) discussion in the audience, which can either be conference related, such as for example “*Avatar V: I want an e-book with the form factor of a real book. And preferably that old book smell. – Avatar W: e-books could never replace turning the pages of a book*” or more private, such as for example: “*Avatar X: Hello Y. – Avatar X: Hello X*” 4) questions and answers to presenters, such as for example responses to the question: “*what are the various types of social media you use*”, asked by a presenter 5) facts, such as, for example: “*Avatar Z: [this was] one of the first films ever to use composing techniques, it was quite impressive and scared the first viewers, that’s a little bit of film history for you*” 6) reflection on self and on status in real life, such as for example: “*Avatar AA munches his red licorice*” 7) questions related to the organization, such as, for example: “*Avatar BB: Hello everyone, today’s presentation is being transcribed so those without audio or who require text only can participate in real time. A little explanation about this service*” and lastly 8) comments related to technical subjects, such as for example: “*Avatar CC: Avatar DD, use your Alt key and mouse, to zoom-in on her*”.

Figure 2, below, shows the overall number of posts for each of these categories, across the seven sessions analyzed.

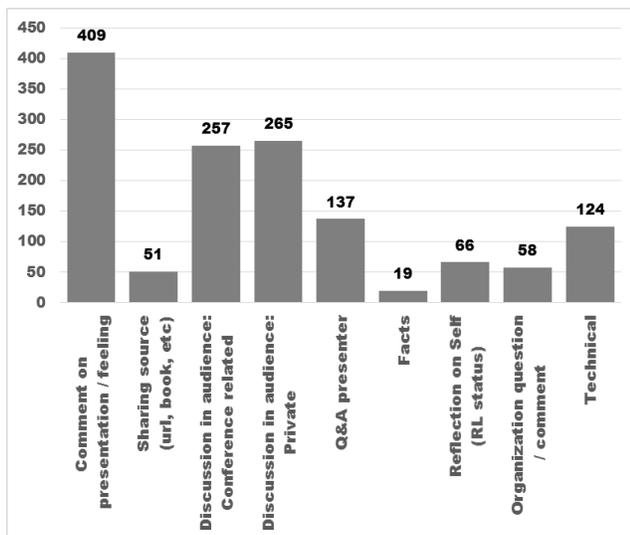


FIGURE 2. NUMBER OF POSTS PER CATEGORY

As can be seen in figure 2, overall, the highest number of posts is related to comments and feelings concerning the presentation or the session itself, with 409 posts, which is 29.5% of all posts. The second highest number of posts is related to discussions in the audience, related to private matters, with 265 posts (19.1%), or related to the conference itself, with 257 posts (18.5%). It is worth mentioning that both items related to the discussions in the audience total, collectively, 522 posts (37.7%), which indicates that one of the first reasons for posting is a need, among conference attendees, to chat and exchange with the other participants. Questions and answers to the presenters totals overall 137 posts (9.9%), placing the desire to interact with presenters as another important reason to post in VW conference digital backchannels. Technical comments follow with overall 124 posts (8.9%). Table 2 and figure 3 below show the distribution of the categories of comments.

TABLE 2. NUMBER OF COMMENT BY CATEGORY IN THE 7 ANALYZED SESSIONS.

	F1	F2	F3	F4	F5	S1	T1	Total
Comment on presentation / feeling	22	26	68	13	74	47	159	409
Sharing source (url, book, etc)	0	4	6	1	20	8	12	51
Discussion in audience: Conference related	3	22	40	3	72	75	42	257
Discussion in audience: Private	7	24	68	11	67	46	42	265
Q&A presenter	43	22	0	3	27	38	4	137
Facts	0	10	5	0	1	0	3	19
Reflection on Self (RL status)	1	23	20	1	3	5	13	66
Organization question / comment	8	1	9	6	14	3	17	58
Technical	0	10	50	30	13	0	21	124
Total number of posts	84	142	266	68	291	222	313	1386

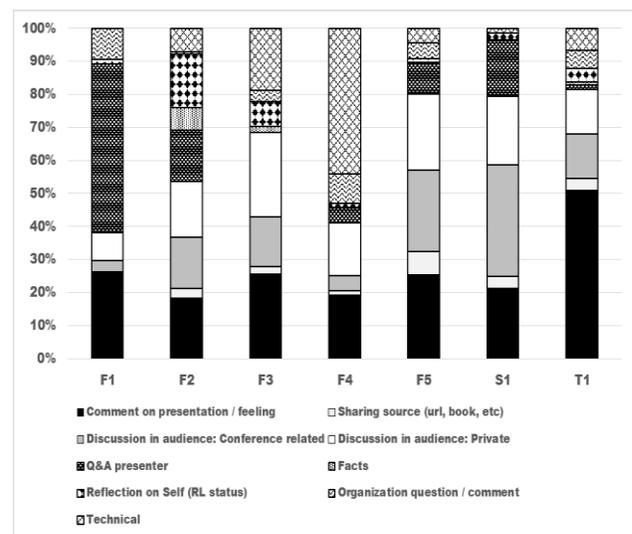


FIGURE 3. DISTRIBUTION OF TYPE OF COMMENTS FOR EACH OF THE SEVEN ANALYZED SESSIONS.

This analysis shows that there is a very wide spread in the distribution of the types of comments exchanged between one session and the other, even for sessions that are of similar type, like presentations. Figure 3, which shows the distribution of types of comments, for each of the seven analyzed sessions, shows for example, that the most common type of comments in the presentation session that took place on the Thursday (T1), first day of the conference, were comments and feeling on the presentation, with almost 51% of the posts pertaining to this category. On the first session of the Friday (F1), the most common types of comments were questions and answers to the presenters, with slightly more than 51% of the comments being Q&A. On the fourth session of the Friday (F4), the most common types of comments were related to technical subjects, with slightly more than 44%. All three sessions were presentations. Lastly, the roundtable session (F3) does not indicate a pattern that looks dramatically different from the presentation sessions, neither in terms of distribution of comments categories, nor in terms of overall number of posts, as the 266 posts of the roundtable session are comparable with the respectively 291, 222 and 313 posts of presentation sessions F5, S1 and T1.

The number of participants to each session was not available, however, for 2 of the sessions, S1 and T1, this number was available and shows that in both cases a majority of the participants posted at least 1 comment in the digital backchannel, with 52.7% of the 148 participants posting a comment for the T1 presentation session and as much as 69.7% of the 53 participants in the S1 presentation session, posting a comment.

The average number of comments posted varied a lot with on average 4.7 comments per poster for the 7 sessions, ranging from 2.6 comments per poster on average in session F4 and 7.1 comments per poster in session F2. The overall spread of posts between posters was extremely large, with the participants who posted the most, placing 74 comments, and the one posting the less, placed 1 comments over the 7 sessions. Further results can be found in appendix 1, at the end of this paper.

A further analysis indicates a median of number of posts per poster at 3 and a mode at 1, clearly confirming, as indicated in appendix 2, that although there is a handful of posters who place a very high number of comments, the vast majority of those who post, only posts a few comments overall.

We felt that it was important to understand if the comments did bring value to the presentations and if they were useful. We therefore decided to further split the third category, “discussion in the audience”, into 2 sub categories: 3a) conference related discussions and 3b) private related discussions. This further allowed us to classify all the comments categories into those that add value to the sessions and those that do not add value to the sessions. We defined as adding value to the sessions,

categories 1) comments and feelings related to the presentation, 2) sharing sources such as urls, books, etc, 3a) discussion in the audience, conference related 4) questions and answers to presenters and 5) facts, and as not adding value to the sessions, the remaining categories 3b) discussion in the audience, private related 6) reflection on self and on status in real life, 7) questions related to the organization and 8) comments related to technical subjects. Furthermore, among the 4 categories identified as not adding value to the session itself, we were able to identify that 2 still provided useful input in a broader sense: 7) questions related to the organization and 8) comments related to technical subjects, while the 2 remaining ones: 3b) discussion in the audience, private related and 6) reflection on self and on status in real life were defined as “babble”, more of a social dimension than providing any useful information whatsoever, related to the conference (Table 3 below summarizes the distinction between comments adding value or not adding value to sessions. This enabled us to assess the proportion of useful comments and the proportion of useless comments, as pictured in figure 4 below.

TABLE 3. DISTINCTION BETWEEN COMMENTS ADDING VALUE OR NOT ADDING VALUE TO SESSIONS.

1) Comment on presentation / feeling	adds value	
2) Sharing source (url, book, etc)	adds value	
3a) Discussion in the audience: conference related	adds value	
3b) Discussion in the audience: private related	no value added	babble
4) Q&A presenter	adds value	
5) Facts (status)	adds value	
7) Organization question / comment	no value added	useful
8) Technical	no value added	useful

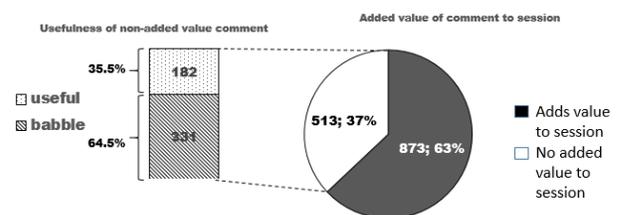


FIGURE 4. USEFULNESS AND VALUE ADDED OF COMMENTS IN THE 7 ANALYZED SESSIONS.

63 % of the comments made during the conference added value to the sessions, whereas 37% did not directly add value. However, among these 37%, 35.5% were still useful and 64.5% could be purely defined as “babble”.

A word count analysis was also separately performed on the in-world digital backchannel exchanges, using AntConc [31], on the corpus of 31136 words, which included a total of 5206 word types. The original data corpus was lemmatized to group together similar words based on their normal form [32], which reduced the number of word types to 4501 and finally, words such as avatar names, articles and prepositions were excluded to keep the focus on the meaningful words. Here again, all verbs and pronouns were kept in the count, for comparability reasons, as well as because they were not considered to be neutral to the analysis. This step further reduced the number of words to 23492 and the number of word types to 3705. Results of the 20 most frequently used words in the digital back channel for the 7 sessions was less informative than with the awards session as among the 20 most frequent words are the verb “be”, as the most used word, the pronouns as “I”, “we” and “you” ranked as the second, third and fourth most used words. The first meaningful word, “snapshot” (indicating pictures taken by participants), mentioned 194 times, ranks as the tenth most used word. Then at rank 15, the word “thank”, was mentioned 145 times, at rank 22, the word “learn” was mentioned 110 times, and the word “what”, at rank 24, was mentioned 107 times.

### *III. Comparison with research on Twitter*

As explained in the methodology section of this paper, we did not perform any analysis on the use of Twitter, but compared the use of built-in digital backchannels in VW conferences with the use of Twitter as a digital backchannel in real life conferences, based on previous research on Twitter [26], which had identified 6 distinct user intention categories: 1) comments on presentation, 2) sharing of resources, 3) discussions / conversations, 4) jot down notes, 5) establish online presence and 6) post organizational questions, as well as a seventh category labelled “ambiguous”, which hardly included any tweet and that we will ignore in our present comparison as it is irrelevant to our research purpose. Ross et al [26] identified that the category “jot down notes” represented the highest share of tweets (43%) in the conferences they analyzed. Yet, we did not identify such a category in our VW conferences digital backchannels communications. An explanation is hinted by Ross et al’s [26] conclusions that the high occurrence of “jotting down notes” on Twitter during conferences “frames the conference community and allows others to participate”. Clearly, the purpose of Twitter being to post comments that can be accessed in the outside world, beyond the conference audience, differs from the purpose of VW conferences backchannels, which is to allow communication and exchanges amongst those virtually present in the location of the conference session.

By contrast, the category “comments on presentation” represents less than 4% of the posts in Ross et al.’s [26] study, which is negligible compared to the 29.5% of posts

that our research on VW digital backchannels allocates to this category. Ross et al [26] also highlight their surprise at the low percentage of tweets regarding comments on the presentations, which they identified as contradicting previous research [22] which argued that Twitter offered a digital backchannel enabling further debate, comments and discussions. Ross et al [26] ask themselves if the use of Twitter as a digital backchannel during conferences, is not more about fulfilling the participants’ need to establish an online presence, rather than to promote what they call “a participatory conference culture”.

In line with establishing a participatory conference culture, the discussions and conversations also show different results for our study, compared with Ross et al.’s [26] Twitter study, where 23.8% of posts fall under this category. In our study, 37.7% of posts fall under the discussion and conversations category. However, in our study, we make a distinction between conference related discussions (18.5%) and private discussion (19.1%), each accounting for almost half of the 37.7%. The Twitter study does not make this distinction, making it difficult to really compare the number. However, if we consider our category “question and answer with presenter” (9.9%) as a type of discussion and conversation category as well, this would clearly position discussions and conversations held in digital backchannels during VW conferences, with 28.4% to 47.6% of posts (depending if we take into account conversations related to private subjects) way higher than conversations and discussions held on Twitter during conferences. This seems to further confirm that participatory conference cultures are more encouraged through VW digital backchannels than through the use of twitter during real life conferences.

Another important differences is on the sharing of resources. The Twitter study, by Ross et al [26] states that almost 15% of the posts concern sharing of resources. In our VW digital backchannels study, this percentage drops to 3.7%. One possible explanation to this, could be that the number of additional resources exchanged on digital backchannels during VW conferences is not lower than those exchanged through tweets during real life conferences, but it is only the relative size of this number of posts that appears much lower since other categories (comments on presentation, conversations and discussions, questions and answers to presenter) are boosted by the participatory conference culture promoted in VW conference settings.

Ross et al.’s [26] category “establishing an online presence”, described by the authors by “the users alerting each other to their presence” can be compared to our category “reflection on self” and amounts to less than 5% of the posts in our VW digital backchannel research, hinting that as in a digital world, one’s avatar makes the presence almost physical and visible to all participants, people don’t have the urge to establish their virtual presence by other means.

Lastly, the “technical” category in our VW digital backchannels research does not seem to exist in the Twitter coverage of real life conferences, as there is much less or no “technique” at all involved in real life conferences, compared to VW conferences. However, this category is consistent with what Cogdill et al [28] call “Participation enabling backchannel”, in their taxonomy of backchannel discourse, and that they describe as “*to help users function better in the forum or environment in which a public discussion takes place*”.

Regarding the usefulness of posts, the Twitter study of Ross et al finds that 66% of tweets provide information, whereas 34% correspond to what they call “whispering in class”. These numbers are in line with our findings (respectively 63% and 37%) from figure 4. However, in our study, we further looked at posts that, although not specific to the conference, were still useful as they provided other types of information, and identified that more than 76% fulfilled this goal. It is unclear from the study by Ross et al, if the 66% they mention only cover information focused on the conference content, or any useful information. Nevertheless, both studies confirm that the majority of posts are serious and only a smaller percentage lacks usefulness.

Regarding the number of posts by poster, the twitter study is in-line with our findings in appendix 2, that a small number of users post very often, whereas many users only post a few times.

Lastly, the comparison of most frequently mentioned words through the word count analysis, does not enable to draw anything conclusive, mostly due to the fact that the themes of the analyzed conferences were quite different, and that it is likely that words used are, at least partly, correlated to the theme of the conference. Yet, we can see that the word count of twitter posts does not include, among the 20 most frequent words, any of our 20 most frequent words, nor does it include any thanking nor recognition word.

## CONCLUSION

This research aimed at understanding if the use of built-in digital backchannels enhances communication, collaboration and knowledge expansion amongst participants in professional communication conferences within VW, at understanding how the potential benefits can be articulated and at analyzing how communication in built-in digital backchannels in VW conferences compares to communication through Twitter in real life conferences.

Our research clearly indicates that the use of built-in digital backchannels does enhance communication, collaboration and knowledge expansion amongst participants within VW academic conferences. Most of the exchanges are either focused on the conference content, providing an added value enhancing the expertise in the subject covered by the conference, or providing useful

input at a broader sense. The remaining comments, defined as “babble” in our research, help improve social interaction between conference participants.

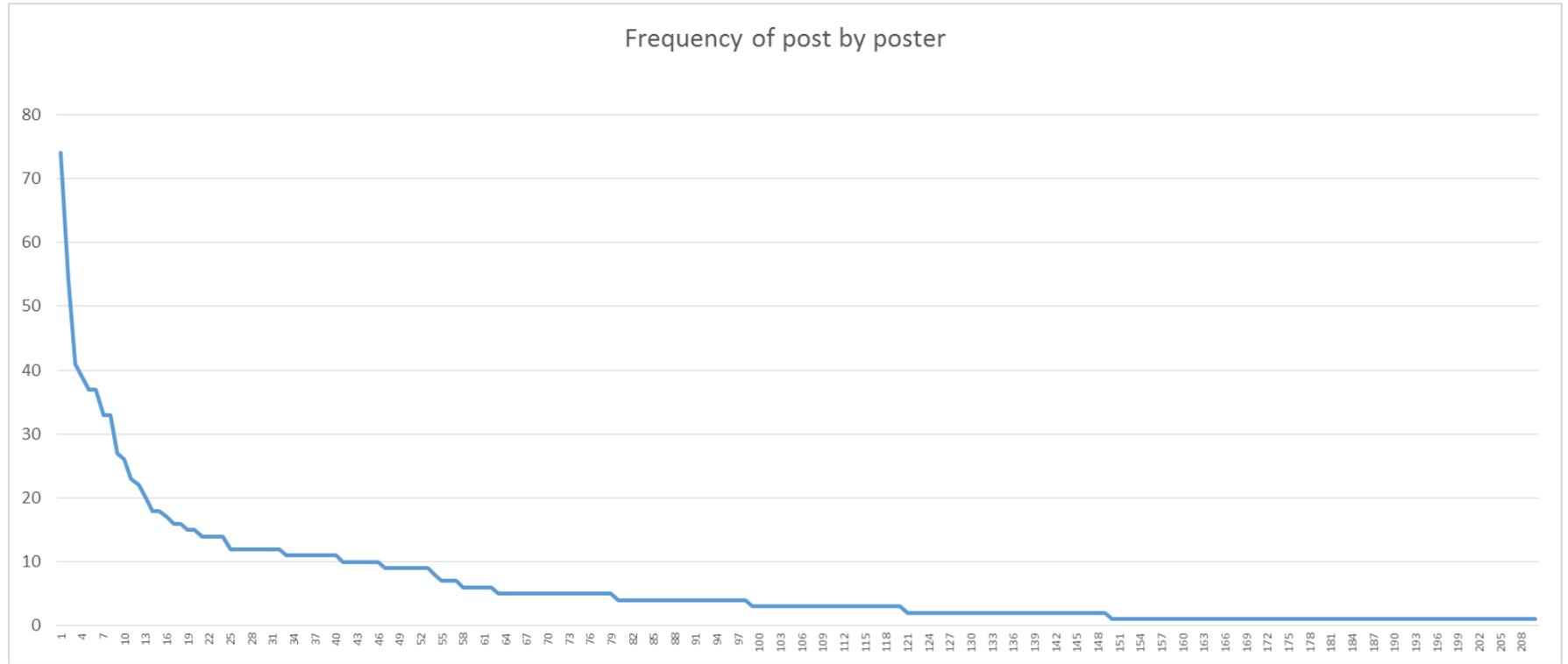
This research also indicates that the use of built-in digital backchannels in VW professional communication and academic conferences is quite different from the use of Twitter as a digital backchannel in real life conferences. It appears that this type of communication in VW conferences is better suited to establish a participatory conference culture, whereas the use of Twitter in real life conferences aims more at enabling posters to establish an online presence, like social reporters commenting on the conference presentations for outsiders. VW digital backchannels seem to be better at providing presenters with clear constructive feedback on their presentation, at creating discussions and interactions amongst participants as well as between participants and presenters. Consequently, the use of Twitter and of built-in digital backchannels within VW’s seem to be 2 complementary media, achieving different goals, but that can be used in parallel.

This paper compared the use of Twitter and of built-in VW communication backchannels at 2 different conferences. The possibility that this might introduce a bias in the results should not be excluded. Therefore, it would be interesting to pursue this research by comparing the use of built-in digital backchannels and of twitter at the same virtual conference, in order to exclude any potential risk of bias. Further research could also look into the possibility to create, in parallel to Twitter, an alternative communication backchannel in real life conferences, that would aim more at enhancing communication within the real life conference, like built-in digital backchannels seem able to do it in VW conferences.

APPENDIX 1. DETAILED TABLE OF ANALYSIS OF THE SEVEN SESSIONS.

	F1	F2	F3	F4	F5	S1	T1	Total	Average		
Type of session	Presentation	Presentation	Roundtable	Presentation	Presentation	Presentation	Presentation				
1) Comment on presentation / feeling	22	26	68	13	74	47	159	409	58,4	adds value	
2) Sharing source (url, book, etc)	0	4	6	1	20	8	12	51	7,3	adds value	
3a) Discussion in the audience: conference related	3	22	40	3	72	75	42	257	36,7	adds value	
3b) Discussion in the audience: provate related	7	24	68	11	67	46	42	265	37,9	no value added	babble
4) Q&A presenter	43	22	0	3	27	38	4	137	19,6	adds value	
5) Facts	0	10	5	0	1	0	3	19	2,7	adds value	
status)	1	23	20	1	3	5	13	66	9,4	no value added	babble
7) Organization question / comment	8	1	9	6	14	3	17	58	8,3	no value added	useful
8) Technical	0	10	50	30	13	0	21	124	17,7	no value added	useful
#posts	84	142	266	68	291	222	313	1386	198,0		
# posters	28	20	38	26	68	36	78	294	42,0		
Average post per poster	3,0	7,1	7,0	2,6	4,3	6,2	4,0	4,7	0,7		
@	0	0	3	0	12	18	10	43	6,1		
Min number of post	1	1	1	1	1	1	1	7	1,0		
Max number of post	10	39	41	10	33	24	25	182	26,0		
# snapshots	15	11	11	23	98	22	0	180	25,7		
# participants						53	148				
Percentage of participants posting						67,9%	52,7%				

APPENDIX 2. FREQUENCY OF POST PER POSTER IN THE 7 ANALYZED SESSIONS.



## REFERENCES

- [1] S. Emad, and A. Broillet. "Reception by members of the audience of the information presented during Professional Communication and Academic conferences in Virtual Worlds." in *Professional Communication Conference (IPCC), 2013 IEEE International*. Pp. 1-7, 2013.
- [2] D. Cox, V. Kindratenko and D. Pointer, "IntelliBadge™: Towards Providing Location-Aware Value-Added Services at Academic Conferences," in *UbiComp 2003*, LNCS 2864, pp. 264–280, 2003.
- [3] D. C. Wyld, "Managing in the Virtual World: How Second Life is Rewriting the Rules of "Real Life" Business," in *Advanced Techniques in Computing Sciences and Software Engineering*, pp. 123-128, 2010.
- [4] L. Dawley, "Social network knowledge construction: emerging virtual world pedagogy," in *On the Horizon*, Vol. 17 Iss: 2, pp.109 – 121, 2009.
- [5] F. Van Klaveren, "Will your next poster session be in a virtual world?" in *The Biochemical Society, Science and Society Regulars*, pp 42-45, 2009.
- [6] C. Liu, Second Life Learning Community: A peer-based approach to involving more faculty members in Second Life. In D. Livingstone & J. Kemp (Eds.), *Proceedings of the First Second Life Education Workshop, Part of the 2006 Second Life Community Convention, San Francisco*, August 20th (pp. 6-10). Paisley: University of Paisley, 2006
- [7] J. Kemp, and D. Livingstone. "Putting a Second Life "metaverse" skin on learning management systems." In *Proceedings of the Second Life education workshop at the Second Life community convention*, pp. 13-18. CA, San Francisco: The University Of Paisley, 2006.
- [8] D. K. Herold, Virtual Education: Teaching Media Studies in Second Life, *Journal of Virtual Worlds Research*, 2(1), 2009 available online at <http://journals.tdl.org/jvwr/index.php/jvwr/article/viewFile/380/454>
- [9] L.J. Eaton, M. Guerra, S. Corliss, & L. Jarmon, *A statewide university system (16 campuses) creates collaborative learning communities in Second Life. Educational Media International*, 48(1), 43-53, 2011
- [10] C. Beaumont, M. Savin-Baden, E. Conradi, & T. Poulton, Evaluating a Second Life Problem-Based Learning (PBL) demonstrator project: what can we learn?, *Interactive Learning Environments*, 1-17, 2012
- [11] Onlive <http://www.onlive.com/>
- [12] SLgo <https://slgo.onlive.com/>
- [13] E. A. Kennedy, E., A., Using Oculus Rift in Second Life, Virtual Emily, Information and opinion about virtual reality, gaming and other fun topics, January 28, 2014, accessed on February 23, 2014 at <http://virtualemily.wordpress.com/2014/01/28/using-the-oculus-rift-in-second-life/>
- [14] The Oculus Rift <http://www.oculusvr.com/> accessed on February 22, 2014
- [15] Luckerson, V., 2014, Facebook Buying Oculus Virtual-Reality Company for \$2 Billion, accessed on March 26, 2014 under <http://time.com/37842/facebook-oculus-rift/>
- [16] M Zuckerberg, 2014 [https://www.facebook.com/zuck/posts/10101319050523971?stream\\_ref=10](https://www.facebook.com/zuck/posts/10101319050523971?stream_ref=10) accessed on March 26, 2014
- [17] Sony Morpheus Project accessed May 2, 2014 at <http://www.sony.com/SCA/company-news/press-releases/sony-computer-entertainment-america-inc/2014/sony-computer-entertainment-announces-project-morp.shtml>
- [18] Avegant Glyph <http://www.avegant.com/> accessed on February 22, 2014
- [19] D. A. Bligh, "What's the use of lecturing?" *Teaching Service Centre*, University of Exeter, Devon, England, 1971.
- [20] M. Gleason, "Better communication in large courses," in *College Teaching*, 34(1), pp. 20–24, 1986.
- [21] R. J. Anderson, R. Anderson, T. VanDeGrift, S. A. Wolfman and K. Yasuhara, "Promoting Interaction in Large Classes with Computer Mediated Feedback", in *Computer Supported Collaborative Learning*, CSCL 2003, pp. 119-123, Bergen, Norway, 2003.
- [22] W. Reinhardt, M. Ebner, G. Beham and C. Costa, "How People are using Twitter during Conferences," in V. Hornung-Prähauer, M. Luckmann, (Ed.) 2009. "Creativity and Innovation Competencies on the Web," *Proceeding of 5. EduMedia Conference*, pp. 145-156, 2009.
- [23] V. Ynge, "On getting a word in edgewise," in *Sixth Regional Meeting of Chicago Linguistic Society*, Campbell, M.A. (Ed), Chicago Linguistic Society, Chicago, 1970, pp. 567–577.
- [24] M. Ebner and M. Schiefner, "Microblogging—more than fun?" in *Proceedings of IADIS Mobile Learning Conference 2008*, Inmaculada Arnedillo Sánchez & Pedro Isafas (Eds.), pp. 155–159, Portugal, 2008
- [25] J. Letierce, A. Passant, J.G. Breslin, and S. Decker. "Using Twitter During an Academic Conference: The# iswc2009 Use-Case." In *ICWSM*. 2010.
- [26] C. Ross, M. Terras, C. Warwick and A. Welsh, "Pointless Babble or Enabled Backchannel: Conference Use of Twitter by Digital Humanists," in Conference abstracts *Digital Humanities*, King's College London, London, July 7-10, pp 214-217, 2010.
- [27] K. Weller, E. Dröge, and C. Puschmann. "Citation analysis in Twitter: Approaches for defining and measuring information

flows within tweets during scientific conferences." *Proceedings of Making Sense of Microposts Workshop (#MSM2011)*. Co-located with *Extended Semantic Web Conference*, Crete, Greece. 2011.

[28] S. Cogdill, T.L. Fanderclai, J. Kilborn, and M.G. Williams. "Backchannel: whispering in digital conversation." *In System Sciences, 2001. Proceedings of the 34th Annual Hawaii International Conference on*, pp. 8-pp. IEEE, 2001.

[29] J. Corbin, and A. Strauss, eds. *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage, 2008.

[30] B. G. Glaser and A. L. Strauss, *The discovery of grounded theory: Strategies for qualitative research*, Aldine de Gruyter, 1967.

[31] AntConc 3.2.4w software by Laurence Anthony, available online at <http://www.antlab.sci.waseda.ac.jp/software.html>

[32] J. Plisson, N. Lavrac, and D. Mladenić. "A rule based approach to word lemmatization.", 2004. accessed on January 18, 2014 at <http://eprints.pascal-network.org/archive/00000715/01/Pillson-Lematization.pdf>

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