

Physiotalk: Connectedness and constructive change – An explanatory theory.

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Introduction

Physiotalk was launched in December 2013 with its main purpose being to help physiotherapists learn, share, influence and ultimately improve services for patients and communities through fortnightly tweetchats and related blogs. A tweetchat is defined as a formalised discussion held via Twitter at a set time on a predefined topic with questions tweeted out at regular intervals and bound by the use of a common hashtag; in this instance #physiotalk. Physiotalk tweetchats are held fortnightly and promoted through www.physiotalk.co.uk, Twitter and Facebook. The tweetchats can be hosted by Physiotalk or by a guest host who has a specific interest in a topic.

In 2016 an investigation of the reach of Physiotalk was carried out using publicly available analytical tools which demonstrated the reach of this digital community both within the UK and globally. In two years Physiotalk had gained 12,592 followers from 113 countries and hosted 61 tweetchats with up to 99 people participating in each chat (Thomas et al 2016). There was a need to explore further beyond these metrics to look at the impact of participating in a Physiotalk tweetchat on the participants, with particular reference to continuing professional development (CPD).

CPD is mandatory for Physiotherapists. The Chartered Society of Physiotherapy (CSP) state that 'Quality, accountability and effective practice demand that you demonstrate that you are keeping up to date with new knowledge, techniques and developments related to your practice' (CSP 2016). Opportunities to access relevant CPD can be challenging, with a survey finding that 57% of health and social care staff do not feel they have opportunities for training to further their career (Johnson 2016). CPD can be undertaken in many ways and before the widespread use of social media, French & Dowds (2008) recognised that CPD could be achieved via 'informal methods' outside of formal courses.

There is a growing sense that social media can be used as a platform to improve professional practice (Chretien et al 2015; Jones-Berry 2016). Cooper & Inglehearn (2015) stated that social media creates an environment where we communicate with multiple contexts and to multiple audiences. Online communities have demonstrated the building of a social learning environment which has been described as a 'collaborative space to build knowledge despite the lack of face-to-face engagement' (Evans et al 2014). Online technology has provided the benefit of enabling people to interact with each other despite time or geographical constraints (Margolis & Parboosingh 2015). This sense of both collaboration and networking is best captured by an online quote from Kenyon (2016) "*Social media can improve health care; it enables learning and collaborating – and it connects people with common interests and passions who wouldn't otherwise meet or know of each other's existence.*"

One major asset of social media is that it is free of direct costs for individuals, although, as with other forms of CPD, there are time costs. This may include the initial time spent in getting to grips with the technology and interface of the social media platform. Archibald & Clark (2014) found there to be a learning curve with Twitter relating to new terminology and 'ostensibly mysterious abbreviations'. However, platforms such as Twitter have the advantage of being portable and easily accessible from a variety of interfaces: phone, tablet or computer (Wilson et al 2014).

The use of Twitter to promote discussion on professionalism for physical therapy students has been found to be a positive experience (Gagnon 2015). Medical students (Chretien et al 2015) and nurses on placement (Sinclair et al 2015) also found the use of Twitter enhanced the student learning experience. Other authors have described 'evidence-based tweeting' in the context of providing links to evidence and referencing peer reviewed publications through Twitter (Djuricich 2014). Social media has been recognised as having the potential to extend professional reach and build professional capital (Cooper & Craig 2013). Conversely, the immediacy of a tweet also has disadvantages, with popular 'wisdom' being disseminated more quickly than reviewed, considered evidence (Wilson et al 2014).

There has been a paucity of research investigating the impact on qualified health care professionals of participating in a Twitter based community. Moorley and Chinn (2014)

wrote about the development of one community (WeNurses), focusing on the development of the online nurse tweeting community rather than the impact of participation. Chinn (2015) then recorded anecdotal elements from district nurses taking part in a tweetchat. Tweetchats have existed within medical education since at least 2011 (Djuricich 2014). Gilbert (2017) interviewed 24 participants in a multidisciplinary health-related online community of practice who use tweetchats (#hcsma) and found that participants were motivated to participate by a desire to learn, which was fulfilled for many. There is research supporting the use of health-related hashtag conversations to enable knowledge sharing and nurture relationships (Xu et al 2015), suggesting potential for enhancing CPD opportunities and professional practice. Bolderston et al (2018) investigated participants' views of a twitter-based journal club for medical radiation practitioners and found that they used this as a form of formal CPD with evidence that participation informed clinical practice.

While there has been an explosion of profession-related Twitter-based communities using tweetchats, more research is needed into the impacts of these, particularly in physiotherapy. Shibu et al (2015) conducted a literature review and found no articles regarding the use of social media as a tool for CPD by physiotherapists. At the time of writing, our literature search using the search terms 'Twitter' or 'Social media' AND 'Physiotherapist' or 'Physical Therapist' failed to produce relevant papers. Hence there is a need to explore whether participating in a tweetchat influences the practice of physiotherapists and thereby constitutes useful CPD.

The popularity of using Twitter for research is high, with Ahmed (2017) saying that no other platform has attracted as much attention from academics. Uses include the promotion of results and recruitment to studies (Amath et al., 2017) as well as using tweets being used as data in their own right. The latter most frequently makes use of data 'harvesting' methods – using search methods to collect tweets from the ongoing stream relating to a specific hashtag (Hays and Daker-White, 2015). Researchers have used a variety of methods to analyse tweets. For example, Hays and Daker-White (2015) used a qualitative methodology to identify a range of concerns following a hashtag search, whereas McGinnigle et al (2017) utilised a quantitative methodology to analyse participation in a tweetchat. Smith and Milnes (2016) advise that the rationale for using a social media platform for research should be consistent with the

study aims, as should the analytical method chosen. It is important that data collection and analysis methods, translated and adapted for the medium and context, are congruent epistemologically with the justified approach. Whilst most studies may make use of a stream of tweets, a tweetchat has the potential to provide a forum for discussion of its impacts. Focus group methods are particularly useful where a group experience is being explored (Smithson 2007) and the use of a tweetchat in this context has been utilised by Ward et al (2018).

Therefore, this study aims to explore the impact of Physiotalk tweetchats participation on continual professional development and professional practice, from participants' perspectives, as expressed in a predominantly Twitter-based focus group.

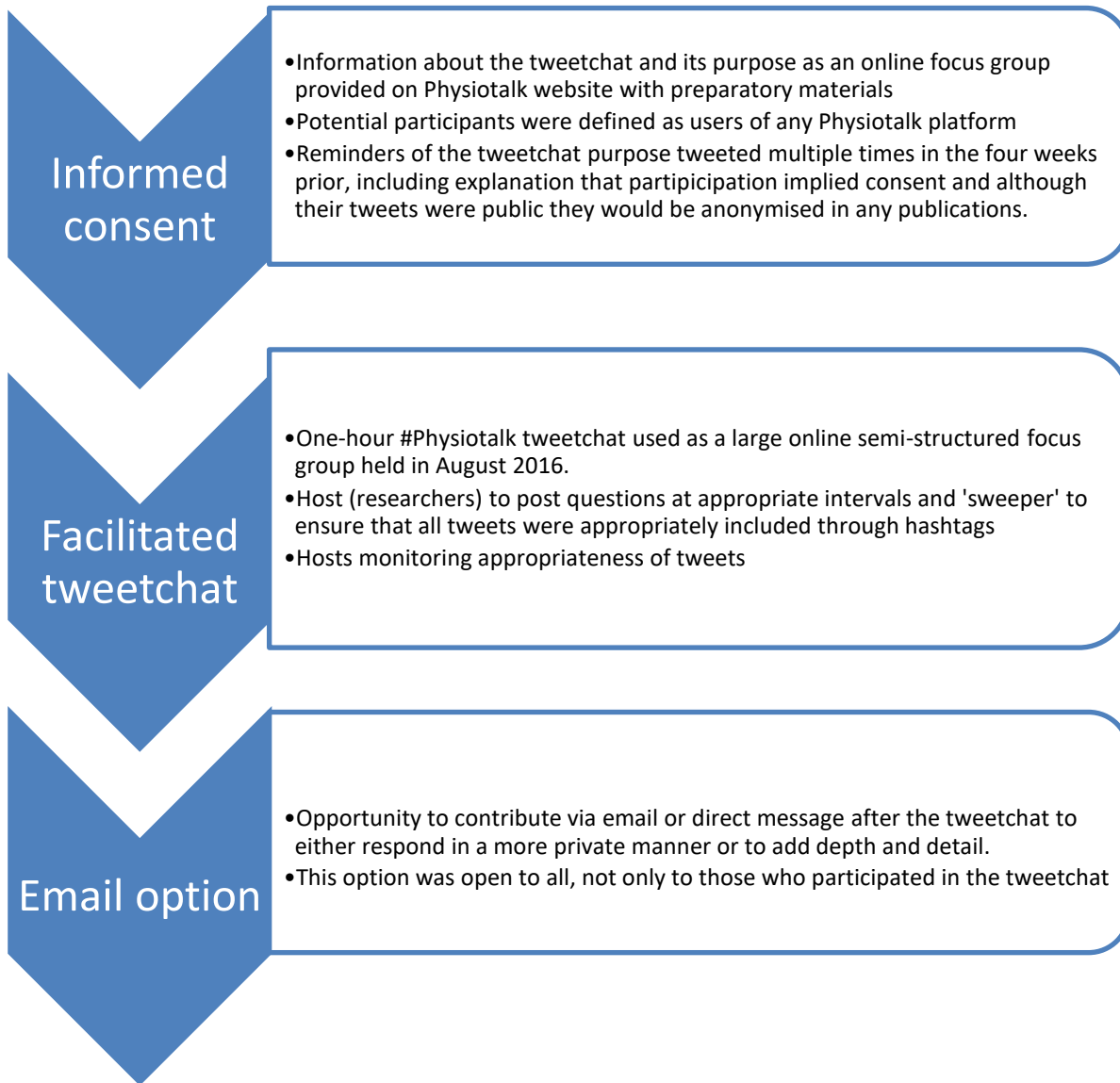
Methods

Study Design

A Physiotalk tweetchat was used as an online focus group supported by the option to email or direct message responses to questions posed. The study approach emphasised interpretation of the words of people with different motivations and perceptions. A phenomenological approach was used to gain insight into the meanings they attributed to participation in Physiotalk. Reflexivity was used to explore potential impacts of the researchers and prioritise the perspectives of participants (Grbich, 1999; Lopez and Willis, 2004).

Ethical approval was sought for this study from the appropriate Higher Education Institution due to the study's prospective design, despite the public nature of the tweetchat. There were two options for data collection, summarised in Figure 1.

Figure 1. Summary of data collection methods



The research tweetchat was supported in the same way as any other Physiotalk chat. The chat host was the researcher and another Physiotalk member monitored the chat to promote use of the chat hashtag in all relevant tweets. Participants in all Physiotalk chats are guided to the website before and during the chat for information both around how to tweetchat, but also around maintaining professionalism during social media exchanges.

During the hour long Tweetchat and via the pre-chat blog posting, participants were invited to respond to the question **‘What does Physiotalk mean to you?’** with follow up questions:

‘How do you use Physiotalk?’

‘What prompts you to participate in Physiotalk activities?’

‘What affects your participation in Physiotalk activities?’

‘Has taking part in Physiotalk impacted on or contributed to your CPD?’

‘Has taking part in Physiotalk impacted on your practice?’

These questions were chosen as broad starter questions to promote discussion. The questions were made available via all platforms prior to the tweetchat to allow participants to consider their responses in advance, as a tweetchat can be a fast-paced discussion. The questions were then tweeted out one at a time during the tweetchat to provoke and promote responses from participants. Apart from these questions, participants were also prompted via further tweets to expand on a specific idea put forward in a tweet if further clarification was required. Otherwise the tweetchat was allowed to flow naturally through discussions between participants.

There was no guidance offered as to what was meant by ‘impact’ or ‘participation in Physiotalk’ – the impact was user-defined in order to gain a full and complete picture of participants’ own reality of the meaning of interacting with Physiotalk and the impact of participating on their practice and CPD.

Data processing and analysis

The analysis process is summarised in detail in Figure 2, and followed the process of:

- Open coding - where similar ideas are grouped to form initial categories.
- Axial coding - where categories of text are grouped to form themes that start to make sense of the ideas and form connections.
- Selective coding - where the themes are organised in a way that illustrates and demonstrates connections that are supported by text and interpretation to develop understanding of the phenomenon (impacts of Physiotalk) (Strauss and Corbin, 1994).

Re-tweets during the chat were interpreted as other participants showing validation or agreement of the ideas contained in the original tweet but were not further analysed. Tweets with social purpose, such as welcomes to the chat, were also not analysed further. One tweet provided a link to a website, but this content was not analysed

further as it was seen as informative rather than providing insight into the participants' views (La Rosa, 2013).

Figure 2. Summary of data processing and thematic analysis

Data management

- Download of transcript collated via Symplur to Microsoft Excel: one-hour tweetchat plus 15 minutes of further contributions to allow chat to naturally conclude.
- Email responses added to Excel
- Numbering of tweets and email responses in Excel for auditability

Open coding

- Initial cut-and-paste method of analysis using printed transcripts with identifiable tweets to enable team discussion
- Creation of labels to describe tweet content on flip chart paper for each tweetchat prompt question, addition of tweet number to the label
- Process of adding new labels or modifying existing labels in response to each tweet
- Discussion generating groupings of similar labels, defined as theme categories

Axial coding

- Conversion of flip chart pages to mind maps in MindManager 2017
- Identification of overlap between theme categories in each mind map and grouping of related theme categories across prompt questions
- Generation of final theme list with definitions, created in NVivo v10
- Transcript uploaded to NVivo 10 and final themes applied to all text

Selective coding

- Connections between theme categories sought and discussed in depth to generate explanatory theory
- Confirmation of connections based on text

Results

73 people participated in the tweetchat and 683 tweets using the hashtag were collated in the transcript, with two people providing a response to the set questions by email. The webpage with the research chat information was viewed 313 times prior to the chat (July and August 2016 page hits). The tweets were sent when the maximum character limit was 140 per tweet. Analysis of tweets and coding resulted in 29 themes and two overarching, linked, sub-theories. These are: connectedness with the structure and function of tweetchat and the constructive change and impact of participating in a Physiotalk chat. Summarised tweets for each theme are contained within the supplementary data tables.

Connectedness: The structure and function of a tweetchat

Physiotalk was perceived to be an enabling and relevant, online community. Many contributors highlighted this as the foremost reason for participation, describing a sense of belonging to the wider physiotherapy community. This community was expanded from their usual network of geographically close colleagues which was reported as *'an opportunity to chat to people I wouldn't normally have any link to, about a common interest'*. The *'biggest win'* was seen as access to and networking with colleagues globally and the new perspectives this enabled. Other wider communities for individuals were also identified; those beyond both their specialism and profession taking part: *'Chance to meet a more global community & physios from other localities, invite external views, so many positives!'*. Conversely, being able to connect with people within their speciality but outside of the usual geographical location was also highly valued. This appeared to be crucial to those practicing within a niche speciality: *'and if we are isolated in terms of speciality, as well as location'* as it widened access for debate and discussion in their area of practice.

The breadth of the background of participants came through strongly with the sense that all voices are equally valued, including those of patients and other health care professionals *'As a patient, #physiotalk has built links that allow discussion where my views differ'*. In a counterpoint to this, questions were posed as to whether a specific type of person is attracted to twitter and tweetchats, i.e. despite diversity in backgrounds there might be similarities in personalities: *'By its very nature #physiotalk*

can attract likeminded. But not a bad thing as long as recognised and challenged'. A point raised was the perceived dominance of physiotherapists from some specialities on twitter and the lack of others, leading to potentially skewed conversations: *'neuro physio not as active as MSK [musculoskeletal] on twitter'*.

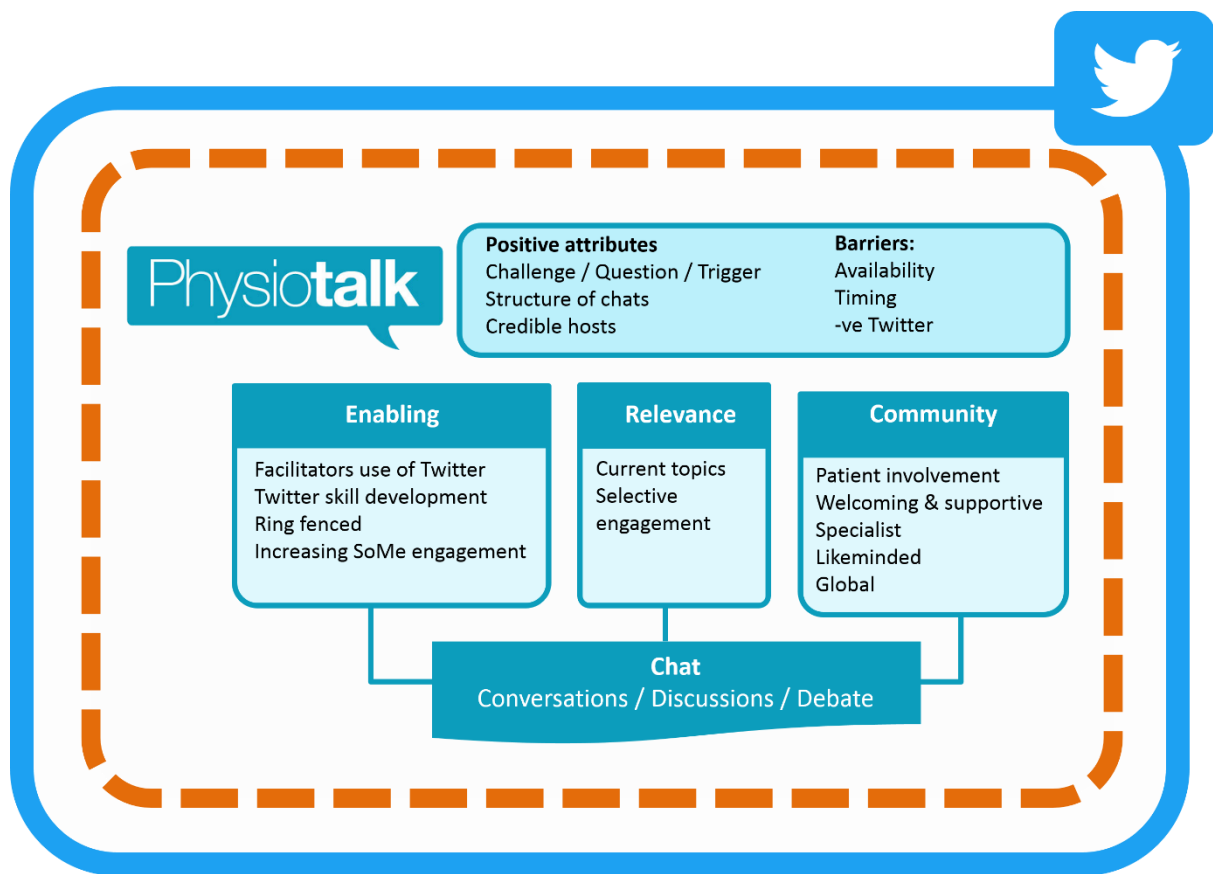
The twitter platform was also seen as enabling, allowing convenient, virtually instant, access to information and colleagues. However, features specific to Physiotalk were also important. Central to the connectedness of participants was the sense that Physiotalk is a constructive space *'It gives structure to an essentially structure less platform'* with the moderation, structure and regularity of tweetchats seen as positive characteristics: *'Regular spot of Monday night is helpful, physios like structure'*. The tension between being accountable in a public space and also being able to promote critical debate was recognised: *'accountability & professionalism in a public interface is important'*. A strength was the credibility of guest hosts, who also reciprocated by expressing positive impacts of this role.

With hashtagged tweets coming through at around 10 per minute, tweetchats are fast paced. This was a barrier for some: *'I find Twitter really hard to use. Too many conversations going on at once = overload.'* Others recognised that with practice and familiarity with the underlying technology these barriers could be overcome: *'I think it takes some getting used to! My first few tweetchats = chaos but now I'm ok'*. There was some discussion around other types of social media for CPD, although perhaps unsurprisingly Twitter was the preferred media for those taking part: *'ooh the waffle that can be facebook'*.

The environment created within Physiotalk was felt to be welcoming and supportive where participants felt at ease. Analysed tweets included 'asides' demonstrating the informality of conversations held in parallel with the main chat, for example, one person expressing sympathy: *'Sorry to hear that - hope you are feeling better soon!'*

The linking between the connectedness elements are shown in Figure 3.

Figure 3: Connectedness: The structure and function of a tweetchat



Constructive change: Impact of taking part

The second sub-theory concerned the constructive change in practice from participating which was subdivided into four broad themes: networking, a platform for representation, influencing and innovation and of course CPD itself.

Within the previous sub-theory, 'connectedness,' the sense of community was described as relating to sense of belonging. A counterpoint to this in the sub-theory 'constructive change' was that the networking was considered to be enabling and facilitative of knowledge exchange. The relationships that emerge during a chat develop into face-to-face linkages '*making SoMe connections (into) real professional connections*'. The #Physiotalk network was utilised to share information about other communities including established offline communities. This led further to descriptions of tweekchats being an invaluable platform for professional representation. This was true both for individuals within offline communities and for physiotherapy-based organisations as a whole: '*As President of @WCPT1951 one source to hear, learn about aspects of PT I am not familiar with, key to how I work*'. Tweekchats were seen as a way of developing leadership advocacy and strategic

influencing: *#Physiotalk = gr8 way of sharing research & published evidence for learning & strategic influencing*'.

Tweetchats invite discussion and debate but the moderation during a tweetchat was seen as an enabling feature, allowing testing of ideas without descent into arguments or negativity *'#Physiotalk supporting collaboration, encouraging discussion, friendly'*. Participants recognised the boundaries, as there are regular reminders about tweeting with professionalism *'Accountability & professionalism in a public interface is important'* but still initiated discussions that were appropriately critical and challenging *'#physiotalk should be a forum for critical prof debate, incl active challenge & disagreement'*.

An online social space such as Physiotalk was reported as being up-to-date with the regular chats being on topics that were opportune and pertinent: *'I use #Physiotalk (and Twitter) for experiencing „what's on“ in the PT world'*. Participants reported discernment in engaging in relevant chats, due to the choice of topic linking with their field or speciality. They wished to be an *'active contributor'*. In contrast, others deliberately chose chats on less familiar topics to broaden their knowledge: *'I try to follow things I am less interested in broaden mind and a more fun way to do it'*. One issue raised for lack of participation was by those outside of the United Kingdom in different time zones *'Sometimes in time zone where getting up at 2am is too much of an ask'*.

Underpinning all the themes was that Physiotalk was a tool for CPD. As one participant put it: *Ready made CPD=winner*. Three sub themes emerged linking to CPD; Personal development, engagement with research & evidence and broadening views.

There are three main types of people using Physiotalk – those that host a chat, a chat participant and 'lurker'. Hosts reported a specific level of engagement driven by the need to prepare for the chat *'Encourages active thought, and having hosted one, encouraged me to re-appraise literature'*. Chat participants also derived pertinent outcomes from tweetchats *'also its the valuable CPD opportunity that it creates, making me think more about topics that I otherwise might'*.

These outcomes range from career development to specific knowledge gained *'I used #Physiotalk as a student to highlight 'real-life' current issues physios were facing - this really helped in interviews'*. Those not taking an active role during the chat also reported positive outcomes for their CPD with knowledge gained by reading the tweets live or the transcript after the chat: *'I often read late or lurk, partly for CPD also to find new and interesting people to follow'*.

Participating during the chat was often seen as only the starting point for CPD with participants reporting that tweets sparked the desire to delve deeper into the topic with post chat reading activities *'it often prompts 'lines of enquiry' and makes the 'to read' list even bigger!* There were reports of practice being changed or developed as a result of information gleaned from a tweetchat as well as developments being sustained due to the encouragement of other participants during the chat *'I would say so, often pick up a nugget of advice or a new idea worth trying out'*. Underlying this was the awareness that this method of gaining information was accepted by those appraising their CPD.

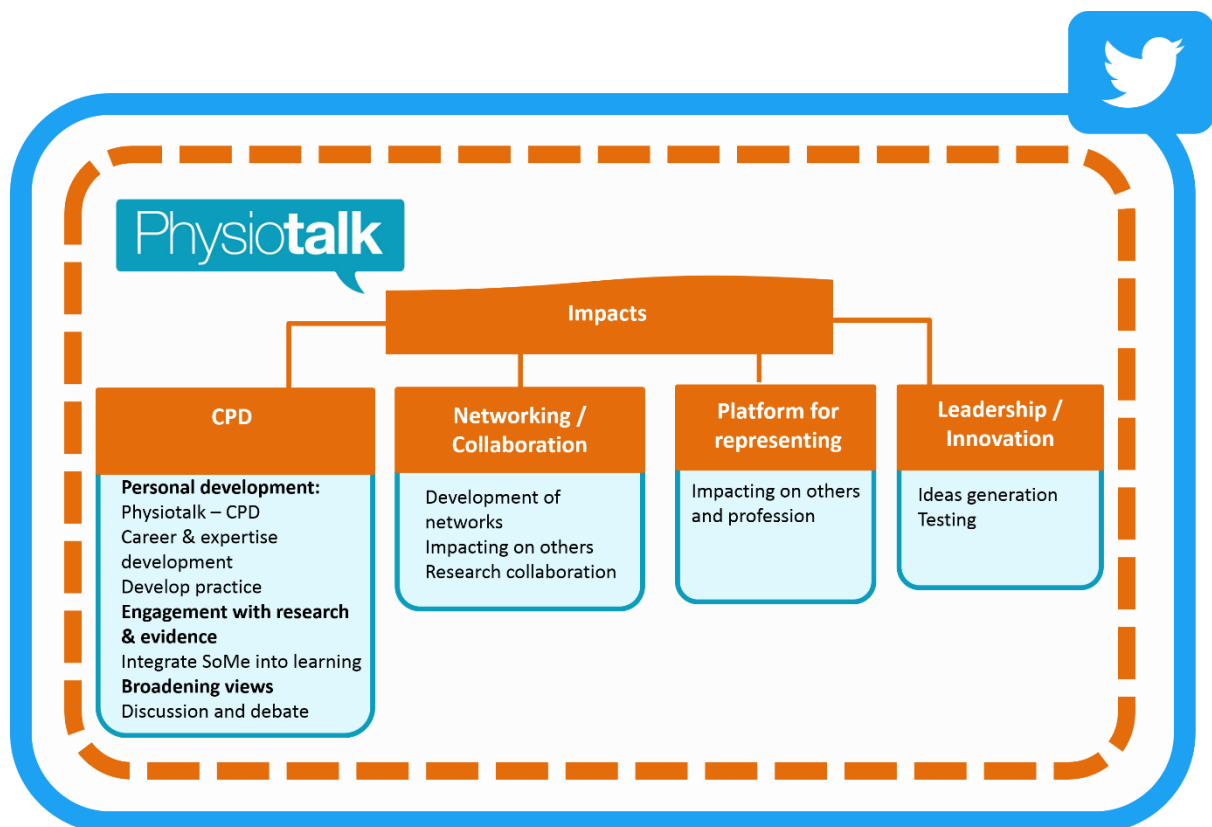
Participants reported that the main consequences for CPD were connected to the immediate access to up-to-date research and evidence: *'a recent tweet I asked re lycra evidence has given loads of info, plus made lots of contacts, plus stimulated quite a debate'*. Evidence shared during Physiotalk was seen as dependable, potentially linked to both the prearranged and facilitatory nature of a Physiotalk tweetchat and the participants engaging with the chat: *'It's nice to hear some sense. Not always so prevalent outside of the #Physiotalk real life and Twitter'*. There was acknowledgement that twitter was a very useful tool for students to engage with a range of perspectives during the discussions: *'as lecturer being able to share it with my students as a way of engaging SoMe for CPD'*.

Finally, participating in a tweetchat was seen to challenge opinions. This was considered to be due to either the nature of the chat topic or the widening of views, as participants came from a broader range of clinical or geographical areas to those they would otherwise be exposed to: *'also I come into contact with a wider view than I'd get at my local office/staff room'*.

Overall, Physiotalk tweetchats were reported as being enjoyable, real time, fast paced and with a wide range of participants: *‘Students, professors, clinicians, PTpresid participate in #physiotalk, that variety is of value’*. One view was this led to exposure to a wider range of physiotherapy opinions than would otherwise be possible offline. Conversely, the argument was also presented that it had the possibility of reinforcing a participants world view as those ‘online’ might come from a similar viewpoint: *‘Love a bit of bias confirmation! Twitter can be an echo chamber’*. A note of caution was also sounded by one participant, in that the tweetchat had to have purpose and the conversation should come to a conclusion.

The links between the constructive change elements are shown in Figure 4.

Figure 4: Constructive change: Impact of taking part



Connectedness and Constructive Change: An Explanatory Theory

As analysis progressed, clear groupings of themes emerged that linked to the tweetchat itself and to the outputs of the chat. The sub-theory ‘Connectedness’

explains feelings of belonging to a community and the enabling nature of a hosted, facilitated tweetchat.

Relevance was important to participants' choices about participation and related to their professional needs and identity. While the community fluctuates over different tweetchats, participants are aware of belonging to a broader global network, and of having joined in a shared learning experience. The sub-theory 'Constructive change' explains the reported impacts of participation, including descriptions of continuing professional development.

Surprisingly, wider impacts were described, including networking, leadership and representation. Networking was seen as a distinct to the earlier sense of community; rather this was reported as the ability to make structured and useful links to pursue and expand ideas and projects with specific individuals who they have met via physiotalk. Crucially, the two sub-theories were interlinked; without the supportive community culture and relevance, participants would be less likely to gain the positive impacts.

Conclusions

Using Twitter and specifically tweetchats is a novel and emerging way for communication and discussion between health care professionals. This research has demonstrated that participants in a physiotherapy tweetchat perceive their participation as leading to two main outcomes; that of being connected to a wider community and the impact of participation on constructive change.

The sense of participants valuing the physiotherapy community on twitter was palpable throughout the responses and this was demonstrated in both the overarching 'connectedness' of the explanatory theory and the networking opportunities leading to further or ongoing constructive change. The ability to connect with others outside their usual geographical or speciality circle of connection was a key benefit of using Twitter. Participants in a medical radiology journal club tweetchat have echoed this, citing global participation, collaboration and networking as key benefits of participation (Bolderston et al, 2017). Gilbert (2017) found that

engagement in a twitter community was based on three social motivators: tapping into a social network of people with a common interest, developing personal and professional relationships, and the community ethos. This was echoed in the current research, although reference was made to a perception that some physiotherapy specialties are under-represented on Twitter. The wider global networking that tweetchats enable may have the potential to create a critical mass of people contributing to a specific clinically-based discussion, even if this is in a small speciality or niche area of physiotherapy.

The barriers to participating in relevant CPD are often cited as time and money (Millet 2011). This study demonstrated that using a platform such as Twitter, which is free and can be accessed easily through a number of platforms, is an enabler for CPD. Participants in a tweetchat have made a conscious decision to contribute to that specific chat, so have invested time in their professional development. It appears however that the ability to access the chat from something as convenient as their smartphone, the satisfaction and enjoyment of taking part and the ability to move in and out of the chat if they wish outweigh the perceived time costs of CPD. Seeking out CPD is intrinsically driven (Ryan, 2003) and it could be postulated that less intrinsic motivation is needed as barriers are reduced in this context through immediate, accessible and relevant learning opportunities. This will not be the case for everyone, as Gilbert (2017) analyses different motivators to engage in social media, in particular those relating to work, finding some people dislike the lack of social presence and fear miscommunication, while others see this as facilitating more egalitarian communities. Further research into the motivations and impacts of Physiotalk on people who do not actively participate in the tweetchats would be beneficial, for example where people view the chat synchronously and who read the transcript later.

Although some negatives of participating were mentioned, such as the fast-paced nature of some tweetchats, it was striking that no mention was made of concern due to restrictive social media policies. It is a professional responsibility to be aware of your workplace, your profession and your regulators' social media guidelines and tweetchat participants are reminded of the need to tweet with professionalism (Physiotalk 2018). The UK Chartered Society of Physiotherapy social media

guidance (CSP, 2014) is supportive and permissive, advocating that members 'embrace social media in a productive, safe and professional manner'. The participants were a self-selected group of regular participants in tweetchats, aware of the need for professionalism and the relevant guidance, and therefore we felt no need to raise this as an issue. Physiotalk tweetchats are not moderated but are hosted with monitoring of the hashtagged tweets during the questions and discussions. This may act to give confidence to participants and certainly the structure this affords was recognised and appreciated by participants.

Another key feature was the impact that participation had on professional practice, additional to CPD. This was highlighted as relating not only to specific clinical information being tweeted out, but to the ability to link in with key strategic influencers in a specific area. The methodology did not examine who individual tweeters to discover if they could be seen as well-known influencers or more novice professionals who were likely to be being influenced. Caution must be used within this, as twitter communities have been found to discuss issues within an 'echo chamber' potentially reinforcing a certain view (Gilbert, 2017) and this concern was also voiced during this research tweetchat. It is highly likely that participants may have similar values, linking in with Gilbert's assertion that while roles of online community members are diverse, their values may be more homogeneous. Whilst individuals can counter this by seeking to follow varied accounts on Twitter, it may be more difficult to encourage a more diverse range of individuals to participate in a tweetchat.

This novel data collection approach using a tweetchat with an established online community as a large, international, online focus group raised some interesting considerations during the planning and analysis. The researchers took the view that ethical approval was required for this prospective research. Others have taken the view that tweets are public data and reported them in research without explicit consent (Williams et al 2017). Williams et al reflect that there is an increasing blurring of the private and public on social media with subsequent need for updated ethical considerations. They report that some learned societies now state that 'participants must be clearly informed that their participation and interactions are being monitored and analysed for research'. There is now a wealth of online data,

very attractive to researchers who may have excellent foundations, for example, online discussion forums run by charities for specific conditions such as Multiple Sclerosis. These may have specific statements about how the information can be used, which should be respected. The National Centre for Social Research (Beninger et al., 2014) analysed user views on research using social media. Some participants felt that consent and anonymity are not needed while others felt either or both were needed for moral and legal reasons and to promote trust. We used their suggestions to improve practice, including transparency during the recruitment process to maintain trust of the users, and decided not to use identifiers of tweets in data reporting. This is a rapidly evolving field with guidelines being produced and updated as new situations emerge. Thoughtful and cautious consideration must be made therefore when planning to use social media for research purposes.

There are also issues in the use of a tweetchat to gather information, as by its nature it is fast paced, with a limit to the length of a tweet. This precludes a longer and potentially more considered discussion that may be gained from a more traditional focus group approach. There were attempts made to ameliorate this, with a lengthy exposure to the questions ahead of the chat as well as the ability to respond via email or direct message at some length. Whilst the responses may be perceived to lack the richness of a traditional focus group, the ability to recruit a much larger number of participants who could respond as they wished may act, in part, to counteract this.

There must also be recognition that, in the main, the participants were regular contributors to Physiotalk tweetchats. Only two participants tweeted that this was their first time contributing to a chat, although they had followed chats previously. As was mentioned in the chat, Twitter can be an 'echo chamber' with a degree of confirmation bias, with likeminded people being attracted to the concept of a tweetchat. This was recognised by Hays and Daker-White (2015) who advised caution if using Twitter as a standalone data source, as contributors may lie more heavily on one side of a debate than another. This is a potential issue and the responses must be viewed as possibly being confirmatory of a narrower point of view than might be gained using a more traditional method of research.

The decision was made not to examine tweets from specific participants via their Twitter information. Twitter allows for account holders to write a short profile which may include both location and demographic information. These were not examined at all and tweets were analysed for content only with no contextual information around who had written the specific tweet. This was for both ethical reasons and because participants may not have had complete profiles leading to missing information. Depending on the study, there may be value in looking further into who is tweeting each statement and the potential professional 'status' in both an online and offline capacity. Participants in the chat may have consciously or subconsciously given great credence to statements from some individuals during the tweetchat and had a greater tendency to respond to their conversations. The way in which this is done and reported would require further consideration from an ethics perspective.

Each tweet was analysed as a standalone statement. Some were individual tweets but others formed part of a 'thread,' or online conversation during the tweetchat. These were only looked at specifically if part of an obvious response – such as 'I agree'. Threads are often non-linear, with several people replying to the same tweet or part of a conversation and potentially at different times. This can mean that analysis of conversations on Twitter can be complex. Further analysis of threads may enhance understanding of conversation dynamics and the role of influencers but was beyond the scope of this research.

During the tweetchat participants (and potentially people not actively participating in the tweetchat) may have 'liked' or 'retweeted' tweets. The transcript recognises retweets only. These were given a category during thematic analysis and then in effect discarded from further analysis. Many individuals on Twitter include on their profile a statement to the effect that 'retweets do not imply endorsement'. However, implicit in liking or retweeting is some sort of approval or recognition of the tweet, which may again be linked with the 'echo chamber' nature of Twitter. For example, Johansson (2018) found in a political context people are more likely to pass on (retweet) information from ideologically similar peers than from dissimilar sources. Adding the analysis of retweets or likes and indeed the development of conversation threads may be developed further where a qualitative approach is taken that prioritises insight into

the development and evolution of group meaning. This may also give some insights into views of people not actively participating by tweeting i.e. 'lurkers.'

Thematic analysis of tweets could at times be challenging due to the brevity of a tweet which sometimes included abbreviations. The major part of the initial thematic analysis involved all researchers in a room, which allowed for evolving interpretation and discussions of specific tweets before consensus was reached. The physical presence of printed tweets during this stage proved useful to enable real rather than virtual grouping of emerging ideas, and subsequently their definition as themes. Given the online nature of this research this face-to-face step in the analysis could be seen as a surprising step to take and indeed would have been difficult if there had been more tweets to consider. However, this stage proved invaluable as a shared experience ahead of the use of NVivo, a software package that supports qualitative data management and analysis.

Summary

This study used a novel approach of a prospective tweetchat in an established online community as a large, international focus group. This brought both ethical and analytical challenges that require further exploration in the research community. Thematic analysis led to two connected explanatory theories that developed our insights into the impacts of participating in two-weekly professional tweetchats. Firstly, 'Connectedness' described the way in which the structure and function of both a tweetchat, and the community context of this online conversation, supported participation, feelings of belonging and being connected to a wider physiotherapy community. This facilitated impacts of participation, linking it with the other theory: 'Constructive change.' This described impacts on individual's professional development that are easily categorised as CPD, as well as wider impacts on collective professional development that included networking, representation, influencing and innovation. Further research is planned to explore the motivations and impacts of discussions on those who do not tweet but who follow the discussion synchronously or asynchronously ('lurkers').

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