

Written evidence submitted by Plymouth Marine Laboratory (COM0051)

[1.0] Introduction

[1.1] This submission is based upon the dissertation research project “*Tweet-to-who: an evaluation of the current landscape and changing trends in environmental science reporting in relation to social media*”, submitted as partial fulfilment of the University of the West of England (Bristol) Master of Science (MSc) in Science Communication. The overall MSc and research project was sponsored by Plymouth Marine Laboratory and completed in November 2014. The full project report is available on request.

[1.2] This evidence has been submitted to primarily address issues relating to: the trends in attitudes to science and public engagement with science; the balance of effort needed to increase public engagement in science by ‘new audiences’ and by the ‘already interested’, and high quality reporting of science in the media.

[1.3] Plymouth Marine Laboratory (PML, www.pml.ac.uk, @PlymouthMarine) is an independent company, limited by guarantee, with charitable status and a National Capability delivery partner for the Natural Environment Research Council, as well as a designated Research Councils UK research institute. PML undertakes interdisciplinary research that brings together areas of scientific expertise to address key scientific and socially relevant questions relating to the marine environment.

[2.0] Executive Summary

- The digital age and social media (SM) have changed science journalism from a vertical flow of information to audiences to a web of interactions between interested parties (interpretive community members), creating challenges within the field as well as opportunities.
- There is evidence that the media and science communicators/science public relations officers (SC/SPRs) perceive SM as enhancing science reporting and science communication; however, roles and practices need to be altered so that the requirements of interpretive community members are met more fully.
- High quality, accurate and meaningful science journalism is needed now perhaps more than ever as: public interest in science increases; masses of information are freely available from a wide range of sources with limited regulation, and source scientific information is still usually unavailable (pay-wall journals) and often impenetrable to a non-scientist.
- The power to select and frame stories remains largely with the newsroom and journalists have the valuable skills and training necessary to act as curators for their target audience. Science journalism products should be seen as unfinished and developing, as the scientific endeavour is a continuing process, and interpretive communities aid this approach.
- SC/SPR could use SM more widely and not focus use so much on dissemination, to help build stronger relationships with target journalists. Press releases could also be used to provide the media with added value rather than a method of breaking news.
- In the shadow of the claims that SM is a diverse, participatory, ubiquitous public space for science communication, the digital divide, continued dominance of the power elite, reliance on and public access to PR and the potential skewed understanding of public opinion are in danger of creating a potentially superficial public science discourse. SC/SPRs should be aware and take measures to counterbalance, to help maintain and enhance public platforms for highlighting and discussing sound science.

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[3.0] Scene setting

[3.1] The media has been a key facilitator in communicating science to the public since the 1940s (Fahy 2011, Lynch 2014) and the mainstream media (MSM) remains the primary source of scientific information and news outside formal education (Holliman 2011, Secko 2011). As well as the scientific community and the media, science communication often involves (organizational) public relations (PR), providing a vital link between scientists and the media (Secko 2011). There has been limited research into the flows of information between scientists, PR department and the science media and even less when focusing on science PR / media interactions and newsroom practices (Lynch 2014). PR is a mainstay for science organisations and helps highlight their science, scientists, organisation and funders. By its nature it is motivated by private interest but is also a valuable source of information to journalists. Evidence suggests that the competing demands on SC/SPR, such as balancing organisational expectations with journalistic requirements in a rapidly changing and developing communications model, are having a negative impact on effective SC/SPR interactions with the media and that research is needed to help improve these interactions (Lynch 2014).

[3.2] SM is becoming a primary source of scientific information for an increasing percentage of society (Holliman 2011, Secko 2011, Veenstra 2014) and its popularity within newsrooms appears to be growing (Stassen 2010). SM impacts on the newsroom can be seen in changes of practices, structure, news production routines, timescales and even the role of the journalist, particularly in respect to science journalism (Larrondo 2010). As SC/SPRs are trying to engage the media, these changes are likely to have an impact on their interactions with others and it cannot be assumed that traditional roles, practices and values will simply translate to the digital platform (Goode 2009, Murthy 2011).

[3.3] The aim of the research project upon which this evidence is based was to add to the growing body of research into how information is exchanged between the science community and the media and how SM may be changing newsroom practices. SM has dramatically altered the way in which news is produced, consumed and shared. It is therefore important for parties, involved with the information flow between the scientific community and the public, to understand and respond to these changes. By using quantitative and qualitative methods (questionnaire, in-depth interviews, informal discussion group and literature evidence), this project aimed to determine the current media landscape (mediascape) in reference to SM use by environmental science journalists, writers and broadcasters in the MSM, as well as develop recommendations for SC/SPR and identify potential opportunities.

[4.0] Changing mediascape

[4.1] Since the internet became widely accessible and participatory, there have been five main shifts that have impacted upon the mediascape when considering science communication and journalism: communications culture, consumers, newsrooms, perceptions of roles and the science communication field.

[4.2] **Changing communications culture:** Rather than a closed system of newsgathering, production and distribution typical of the traditional MSM (Heinrich 2011), in which there are a limited number of participants with the power to shape news (Trench 2009), SM is an open space of information

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exchange (Van Leuven 2013). SM's features of a mass communication channel and interactivity break down the more formal, traditional model of the power elite passing information down to the masses (Stassen 2010), by enabling a web of interactions between source, journalist and audience. This grouping of various media audiences and stakeholders around a common theme is often referred to as an "interpretive community" (Bruggemann 2014) and SM has become a key facilitator for interactions between members and therefore, stories no longer work in isolation but are influenced by the community that (virtually) surrounds them, (Fairweather 2009). The cultural change brought by SM has turned information constraints into surplus, opacity into transparency, exclusivity into accessibility, hierarchy into networks and passivity into interactivity (McNair 2006). Audiences are no longer simply presented with the final product but can be part of building the story, if they choose to be. Every member of these interpretive communities have the ability to be producers and consumers of news and information (Goode 2009). SM allows users to spread information quickly, cheaply, widely and dynamically to a network of an essentially interested audience (Van Leuven 2013). However, this does increase the risk of not actually increasing communication reach (Allan 2011) and may not necessarily widen the organisation or message's reach.

[4.3] **Changing consumers:** News plays a key role in how audiences understand and interpret the world (Goode 2009). There is growing importance of digital platforms as a key source of science news and information and many suggest that audiences are choosing to move away from the traditional MSM platforms in favour of SM channels (Secko 2011). Studies also indicate that the internet is the most popular source of news in some prominent demographics (Horrigan 2006, Colson 2011), such as the under 30s. In the UK, a wealth of news and information is readily accessible by a large proportion of society (Murthy 2011), literally at their fingertips and as it happens, satisfying the need for a fast-paced mode of communication. Audiences can also shape their own news access (Overholser 2009) by following certain information feeds or engaging with certain networks as well as being part of the news production process. In some cases audience participation has reported to change and/or enhance the focus or angle of a story (Secko 2011), although it is acknowledged that this is rare as journalists are, on the most part, highly in tune with their audience and would have most likely selected and framed stories in accordance with their audience's general values and beliefs (Tremblay 2010). This participation by a range of interpretive community members is where uneasiness is lurking; journalists are skilled in understanding and communicating with their audience and having new participants in the process is shaking up the field. Some are inspired by and engage with the new contributors, seeing it as a positive move in modern journalism, whereas others consider that it is damaging competition, encouraging unskilled practices and increasing potential for misleading science stories (Secko 2011). There is also the opinion that audiences are becoming overwhelmed by the quantity, quality and uncertainty of information, which may disengage their audiences (Fahy 2011).

[4.4] **Changing newsrooms:** Professional journalism has been through a period of unprecedented change over the last 15 years (Holliman 2011, Trench 2009). Newsrooms have been faced with: staff and financial cut-backs; reducing profit margins; casualization of editorial staff; department and managerial reshuffles; increased demands for content; increasing competition; increased inbound information; multiskilling; increasing need for multi-platform content, and less specialism (Holliman 2011, Fahy 2011, Granado 2011, Pew Research Center 2013, Science Media Expert Group report 2010, Allan 2011, Van Leuven 2013, Deuze & Marjoribanks 2009, Webster 2011, Larrondo 2010, Carlson 2011, Stassen 2010, Peters 2012, Secko 2011, Brumfiel 2009, Brainard 2009). Amongst the many impacts these pressures have had, desk journalism is increasing and active news gathering on the decline (Van Leuven 2013, Pew Research Center 2013); one study reported that their participants

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were spending approximately 3.5 hours on the internet, with 62% of 25 – 34 year olds spending over 6 hours a day online. Being bound to the newsroom is likely to increase attention on ‘breaking’ science news, possibly influenced by the fast pace of SM, and reduce time for feature writing and investigative work (Granado 2011). The pressures also increase the temptation to rely more heavily on PR, diary news (regular news activities from the scientific elite, such as Nature) and to be influenced by pack journalism, whereby outlets are covering the same stories to keep up with each other (Granado 2011). There are suggestions that this new approach is weakening traditional journalistic practices (Secko 2011), however, it also deemed essential in a modern media outlet (Emmett 2008). Newsrooms are using SM to produce news quickly and cheaply (Ema 2014); real-time international news and information is available at the desk and consequently decreasing need for costly trips (Van Leuven 2013), instantly updatable, unlimited space (Fahy 2011), targeted dissemination directly to audiences, free or cheaper source material than what was previously available (Murthy 2011) and a perceived reduction in research time. SM are also a useful tool for journalistic sourcing and has widened the pool of sources available to them (Grensing-Pophal 2010), in theory providing a greater range of voices within news coverage. Some journalists go as far as “crowd-sourcing” their ideas and stories, inviting feedback and suggestions (Gynnild 2014) from their audiences to help guide their story development. Although heralded as a useful tool for journalists there are also some significant challenges: information overload, scattered audiences, the by-passing of the traditional gatekeeper role of the (science) journalist and digital inequality between those with internet access and those without (Van Leuven 2013). In the ever-increasing flood of information, information-mining is becoming an increasingly large part of the journalists working life (Arthur 2010) and SM has exacerbated this (Tremblay 2010). Sources can speak directly to audiences cheaply and easily without having to rely on the media as they once did and audiences can now follow individuals of an outlet as opposed to the outlet itself so implications if that individual changes employer (Barnard 2014)? Studies suggest that audiences are more disloyal and scattered; on a range of platforms, requiring different forms of media in an instant and often go wherever the news they want is being reported (Fahy 2011). Finally, some sections of society are not part of this digital conversation and therefore, their opinions and interests are not voiced or heard (Stassen 2010); a concern for any reader-focused journalist.

[4.5] **Changing perceptions of roles.** There is debate as to whether the science journalists’ role has changed in light of the wider changes affecting journalism (Secko 2011, Barnard 2014, Hanson 2009). The dominant view within the literature suggests that there are profound changes occurring, relationships are altering and role perceptions are shifting to fit with the new culture of media communication (Fahy 2011, Trench 2003). This may be different to other newsbeats as traditionally science journalism, by its nature, has been seen to hold an authoritative role and had a greater reliance on elite expertise (Secko 2011). As interpretive communities interact with each other to a far greater extent than before SM, they often by-pass the MSM (Pew Research Center 2013), causing much discussion on whether science journalists can still hold the gatekeeper and watchdog roles they have held in the past. The most prominent suggestion is that they have moved into a role of gatewatcher and curator (Fahy 2011, Bruns 2011), articles have moved from being a finished product to part of a process of understanding (Matheson 2004) and the “we write, you read” model has been debunked (Secko 2011). Many believe that the MSM will not be the primary source of science news and information into the future as science journalists will no longer be an audience’s central authority on science (Secko 2011). However, those not engaged with science may not actively seek out science news so the MSM still provide a default exposure to science and its issues, post formal education. By providing a context or narrative, science journalists are still key players in supporting scientific literacy and sense-making in a time of increasing information and contradictions.

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[4.6] **Changing science communication.** Science communication and science journalism is seen to be flourishing. Having gone through a time of distrust and suspicion following various communication “blunders”, such as the misunderstandings and uncertainties surrounding BSE, MMR vaccinations, GM foods and climate change, science appears to be gaining favour again with society (Fahy 2011). Concurrently, the science communication field has also undergone ideological shifts, moving from one-way flows of information from authority figures and organisations, to public engagement and in some cases, upstream communication and engagement with stakeholders (Smallman 2014). This shift has been seen in recent studies into the content and themes of papers published since 1992 in the *Public Understanding of Science* journal (Smallman 2014), which highlights the move from a ‘public understanding’ mindset to discussions of public engagement and even public leadership (Phillips 2014). Other changes include a fall in research focused on literacy, museums and image of the field to an increase in studies focused on perceptions and impact (Bauer 2012), perhaps showing a maturing of the field. The fast-paced, information snippets that are a key benefit of SM are a big challenge for communicating science, as it increases the risk of science being represented as a series of isolated breakthrough moments with little room for following a story or issue over the long term or with any meaningful context (Murthy 2011, Bianco 2009). Science snippets also compound the issues of representing balance; audiences are left with the impression of scientific flip flops, conflicting information, highlighted and possibly unduly represented uncertainties in balanced coverage, cherry-picking and sometimes even caveats and uncertainties being ignored entirely in favour of a more positive representation or a breaking headline (Bruggemann 2014). In addition, with SM providing audiences with their main source of science news and information, there are concerns that the guiding principles of journalism (objectivity, accuracy, balance, truth) are not being transferred and these values are being lost from the SM science news forum, especially when considering the fast pace of news (Miller 2013). This not only opens the question of whether the information audiences are getting is accurate and representational but also raises concerns over the impact of this information and what audiences will do with this information (Secko 2011): “SM is today’s reality for science communication but there are all sorts of issues in how it influences traditional media environments, filters information and influences societal debates, which are only just beginning to be understood” (Wilkinson 2013). A deeper understanding of the changing requirements, opportunities, challenges and practices of science communications’ key stakeholders and other actors is needed.

[5.0] Key highlights from quantitative data analysis

[5.1] Respondents to the questionnaire were (environmental) science journalists, broadcasters, writers and freelance (categorised as media) and (environmental) science communicators and science PR professionals (categorised as secondary media).

[5.2] Results suggest that the media use SM more widely than the secondary media respondents. The three most popular reasons for using SM (Fig. 1) were “Opens up a direct communication channel with my audience”, “Sharing of media (articles, images, video, games)” and “Freely available, immediate information” each being selected 84% of the time. The free text option highlighted the additional reasons including: promotion, building communities, keeping up with competitors, monitoring opinion, speed and immediacy, free personalised communication tool, extended audience, opens conversation and aggregation of news and information. The media put a greater emphasis on information gathering whereas the secondary media emphasise sharing and communication.

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[5.3] Overall the media indicated that it is somewhat easier to find newsworthy stories in a SM age; a conservative opinion, probably due to the increased information they are required to filter, whereas the secondary media believed that it is now much easier. It is uncertain as to whether secondary media answered from their own experience or assumptions about the newsroom. There was a minor correlation between age and perception of effort, which could suggest that the younger users are more experienced and adept at using SM in general.

[5.4] The media respondents showed a slight lead with regard to dialogue and engagement on SM (Fig. 2). The data revealed that they are slightly more proactive in seeking engagement whereas the secondary media appear more reactive and primarily use SM to disseminate, which is reminiscent of a one-way flow of information that is often considered bad practice within the science communication field (Bucchi 2008). Conversely, the secondary media were more likely to tailor content in response to trends. When comparing data that relates to engagement with peers (Fig 3), the media were far more likely to undertake this activity.

[5.5] The three most popular responses by the media for impacts on the newsroom (Fig. 4) were “Quickened the pace of news”, “Identifies popular topics with the audience” and “Identifies public attitude. Key findings were the difference between the media and secondary media’s selection of the quickening pace of news, perhaps highlighting a potential underestimation of the change in pace at which the newsroom works amongst the secondary media, and a perceived importance in the ability to follow public opinion but in actual fact, has limited influence on the newsroom.

[5.6] Responses show a perception that the use of SM will increase (98% of all respondents) and play an important role in the future of journalism. 100% of media respondents, including non-SM users, reported some or significant impact of SM on traditional news values. Most media respondents were in agreement that the science journalists’ ‘gatekeeper’ role had now changed as a result of SM, with minor leaning towards having a positive impact upon science journalism. Media respondents mainly believed it is somewhat easier to find credible sources with SM, with 28% selecting “No change”. 60% of media respondents indicated there is some level of influence of SM on story selection whereas 52% of secondary media selected “Don’t know”; perhaps this is something the secondary media should become more aware.

[6.0] Key highlights from qualitative data analysis

[6.1] Individual interviews were conducted with a selection of science journalists. Overall there was a general sense that PR still has its place in the exchange of news and information and SM has enhanced PR methods but it still needs to adapt to the changed mediascape and used differently to make PR useful and reliable in today’s newsroom. A somewhat significant number of responses were positive towards PR and its benefit to journalists. However a significant proportion of the responses were constructive criticism based around the slowness of PR in the fast-paced world of SM, how the PR process cannot break news like it used to in the past, PR needing to work harder and an increased understanding the media audience.

[6.2] There were mixed feelings about the impact of SM on the newsroom, with a combination of positivity, negativity, unsettlement and opportunity. The dominant topics that emerged related to: the importance of rich media and visual images and the high level of blog use by the media, as a way to follow the progress of ongoing science and where original reporting is usually generated. There was also significant discussion about the reliance on diary news, the emphasis on increasing the number of

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'clicks', the fast pace of SM news, the increased communication between members of interpretive communities, the repackaging of content for multiplatform use and the increase of information to access and filter. Concerns were expressed over the false representation of science as a series of breakthrough science moments on SM and the damage 'sound bite' science news can have on audiences' understanding of science, the scientific process and societal issues. Responses relating to the ability to track public opinion and interest were more negative considering the emphasis in the literature on SM being a key benefit to journalists for this reason. It is seen as a useful tool to assess public opinion but distrusted to reflect it accurately as it merely represents the opinion of active SM users.

[6.3] With regard to journalistic practice, there was a high level of SM use amongst interviewees and informal discussion participants. One member of the discussion stated that at least 35% of stories in the main body of the paper were sourced from SM. There appeared to be a correlation between level of SM use and type of media outlet / product; daily press generally use SM more, especially Twitter, whereas for broadcasters, SM use varied depending on the type of programme and demographic. A significant number of participants used Twitter as a signpost to interesting stories and to gather background information and latest news on topics and ideas.

[6.3] There was a general feeling that SM could influence story selection and framing but rarely appears to do so; those decisions still rest unreservedly with the newsroom and intelligence from SM is merely interesting. Although not reflecting the questionnaire data, the view of the effect of SM on the principles of story selection was that news values are news values, regardless of the technology; they still represent what audiences are interested in. There was also a view that SM brings an increased ease with which conflict can be manufactured as SM provides a platform for any opinion.

[6.4] There was only one mention of SM widening the pool of available sources but significant comment about predominately seeking news and information from trusted sources, quite often confined to the power elite (Nature, Science etc.), due to the constraints of time and resource. Those that were able to develop stories outside 'diary news', tended to focus on personal trusted sources, by following blogs and individuals' SM channels.

[6.5] Responses surrounding the idea of the science journalists' role in the SM age generally agreed that the science journalists' role has changed as a result of SM but there was less consensus on what the role has changed into. There was a significantly strong identification with the role of reporter of breaking news, despite an overall opinion that it is now harder to break news. Secondary roles included curator, conduit and the watchdog role. A role added by respondents was that of an interpreter of PR, stating that the increased accessibility of PR to the public was concerning. Many stated that education is not a priority and that the objective of any educational content is to make news understandable and education is merely a by-product of their original objective.

[7.0] Discussion

[7.1] There is an obvious remaining need for press releases, with media participants still finding them useful, but there are a range of challenges that are in need of responsive action to improve effectiveness and usefulness of SC / SPR's interactions with the media. One possible added-value activity could be the provision of rich media, such as high-quality images, video, infographics (Lazard 2014), which the media may not have the time or resource to create themselves.

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[7.2] Journalists are trained to effectively read these pieces of organisational publicity and pull out the newsworthy elements to form a relevant story for their audience. There is a belief among the respondents, and supported to some degree by the literature (Secko 2011), that audiences are generally untrained in establishing credibility and identifying PR from various sources so direct news and information without a media intermediary could be damaging to not only science but also the values, beliefs and lifestyle choices of the audiences (Veenstra 2014). Studies do suggest SM audience evaluation focuses around how reliable the news source has been in the past, message topic, username, user image and news source's networks whilst demonstrating difficulty in establishing credibility from the content itself (Veenstra 2014) and therefore, some sections of society will be disproportionality prone to inaccuracies, hype and conflicting ideas (Murthy 2011).

[7.3] Fears that the SM news process will damage science journalism seem unfounded and that technological advancements cannot replace well researched, unbiased, informative reporting. Respondents generally agree that SM is enhancing the area, as are journalistic values for the science SM community (Tremblay 2010, Overholser 2009). There is an overall strong feeling that the traditional role of reporting new scientific discoveries remains the cornerstone of the science journalists' work, albeit somewhat harder in the SM age. With reference to Twitter, this is a channel that seems to be more suited to breaking news rather than longer-term reporting (Murthy 2011); a concern for science communication and the representation of science. In this respect informed aggregation and intelligent curation would be activities to remedy this.

[7.4] The suggested changing role from gatekeeper and watchdog to gatewatcher and curator (Gynnild 2014), more about filtering, analysing, disseminating and commenting, could turn science journalism into a form of quality control, overall beneficial to the science communication community and the representation of science. The science journalist is possibly needed now more than ever to bring together the vast amounts of information to make sense and frame for their audience (Secko 2011).

[7.5] In addition to scientists being in direct communication with audiences, scientists are also in direct contact with the media, causing SC/SPRs to face a similar "gatekeeper" dilemma in the SM age. As much as the science journalist's role appears to need to shift towards more a curator and sense-maker, the SC/SPRs may need to follow suit. This raises the question how much resource do science organisations invest in developing relationships and engagement activities with the media over communicating directly with target stakeholders.

[7.6] Until recently the quantity over quality message was being reinforced by key funding agencies in environmental science, with media activity only being measured and evaluated quantitatively. There has been a shift towards demonstration of true impact of both the science and its communication activities, which perhaps lends itself to a more collaborative approach to news production.

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Appendix 1: Figures

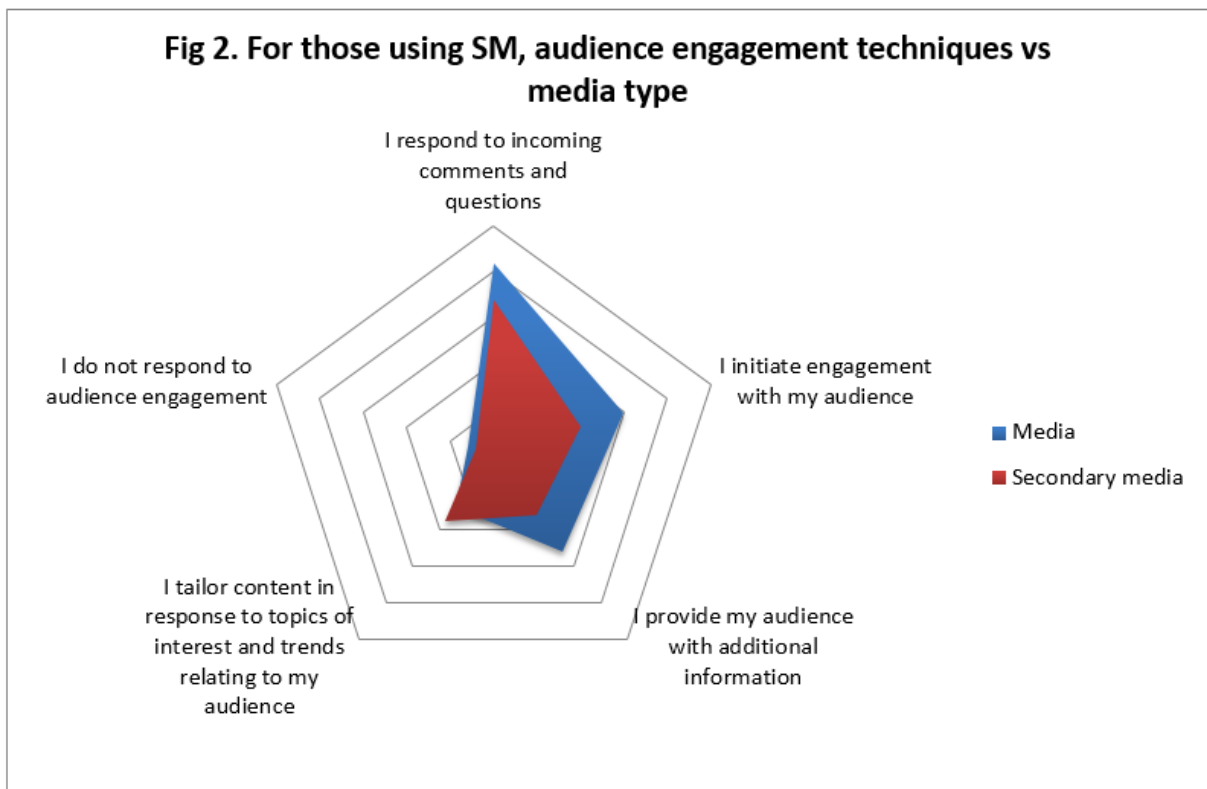
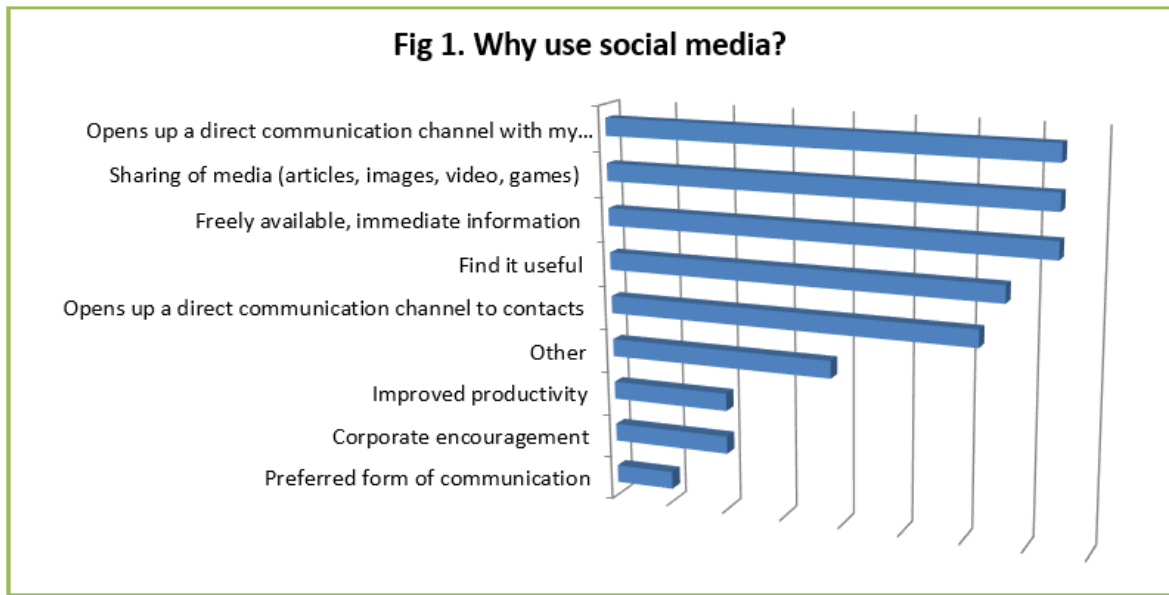


Figure 3. For those using SM, engagement with peers vs media type

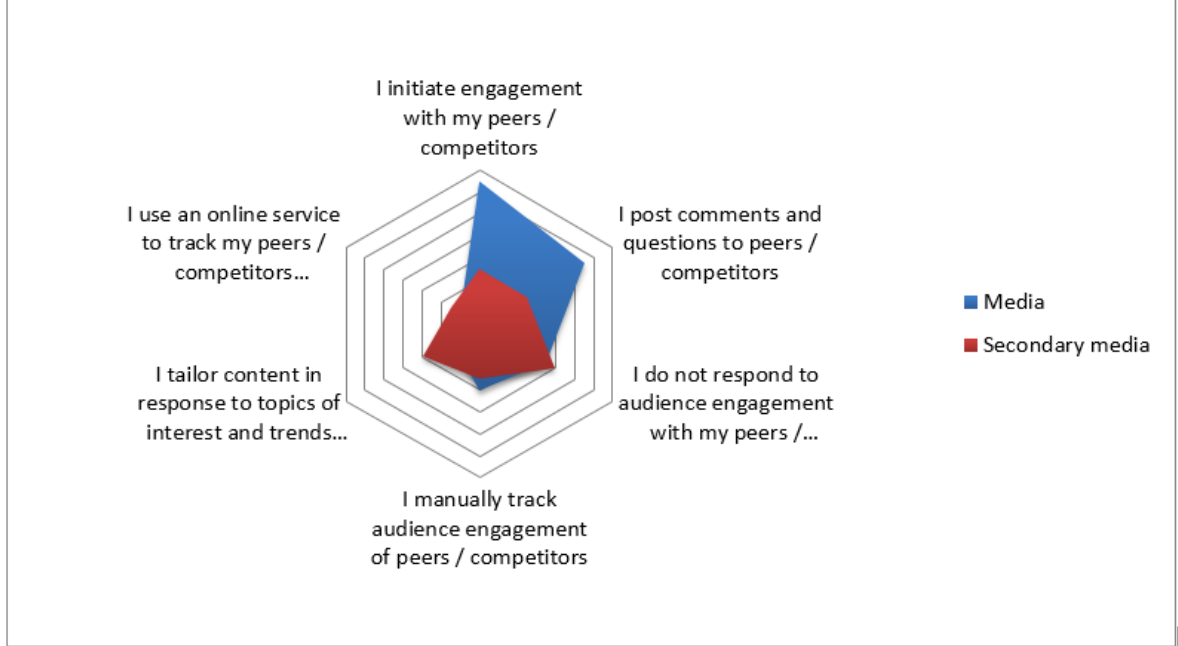


Fig 4. For those using SM, newsroom impacts vs media type

