



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Maintaining a scientific community while social distancing

Dudley W. Lamming^{a, b}, Christy S. Carter^{c, d, *}

^a William S. Middleton Memorial Veterans Hospital, Madison, WI, 53705, USA

^b Department of Medicine, University of Wisconsin-Madison, Madison, WI, 53705, USA

^c Division of Gerontology, Geriatrics and Palliative Care, Department of Medicine, University of Alabama at Birmingham, Birmingham, AL, USA

^d Integrative Center for Aging Research, University of Alabama at Birmingham, Birmingham, AL, USA

ARTICLE INFO

Article history:

Received 18 April 2020

Received in revised form

11 May 2020

Accepted 27 May 2020

Available online 12 June 2020

Keywords:

COVID-19

Isolation

Aging research

Virtual conference

Aging science talks

ABSTRACT

The “Aging Science Talks: Science for the Community” daily online seminar series was established in reaction to the cancellation of a myriad of regional, national, and international meetings focused on the biology of aging due to the COVID-19 pandemic. The inability to attend scientific meetings has far-reaching implications for our field, as we lose the ability to 1) disseminate both published and non-published data through talks and posters; 2) network and establish new collaborations to produce innovative science in the aging field; and 3) continue the career development of early career researchers (ECRs). Through these virtual seminars, we hope to offset the negative effects of these canceled meetings. We established the program rapidly using a “lean” approach, making use of existing technologies broadly available at academic institutions. Here, we provide an initial description of how this program was developed and implemented. We discuss advantages and limitations of this approach, including “real-time” participation and the creation of an on/off-line community of inquiry (CoI). In the future, we hope to formally evaluate the success of this program in building engagement, creating a community, and enhancing the development of ECRs, and to capture metrics associated with the continued progress of science. Our approach to building a CoI may be applied across multiple scientific disciplines during this time of uncertainty, and may offer a valuable example of how to continue to advance science during pandemics or similar events.

© 2020 The Authors. Production and hosting by Elsevier B.V. on behalf of KeAi Communication Co., Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The “Aging Science Talks: Science for the Community” daily online seminar series was established by Dr. Dudley Lamming at the University of Wisconsin-Madison, Department of Medicine, and Dr. William Mair, Harvard T.H. Chan School of Public Health, Department of Molecular Metabolism, in reaction to the many cancelled or postponed meetings focused on the basic biology of aging due to the onset of the COVID-19 pandemic. National and international meeting that were cancelled include the American Geriatrics Society Meeting in Long Beach California, and the *C. elegans* Metabolism Aging Pathogenesis Stress and Small RNAs meeting in Madison, Wisconsin. Postponed meetings include the

Annual Meeting of the American Association of Aging in Madison, Wisconsin, and the Undoing Aging conference in Berlin. Regional meetings cancelled or postponed include the 2020 La Jolla Aging Meeting, and the University of Alabama at Birmingham (UAB) Nathan Shock Center Annual Symposium in Birmingham Alabama. Numerous other meetings at which aging biologists have planned to present, including meetings on diabetes and metabolism at UW-Madison, the annual Experimental Biology conference, and the FASEB Summer Research Conferences have likewise been cancelled or postponed.

The inability to attend scientific conferences and meetings has far reaching implications for our field. Specifically, we lose the ability 1) to disseminate both published and non-published data through talks and posters; 2) to establish new collaborations that will produce cutting edge science in the aging field; 3) to continue the career development of early career researchers (ECRs; students, postdocs, and junior faculty), who lose out on the opportunity for exposure and critical feedback, as well as the opportunity to identify and engage with senior mentors. Indeed, these

* Corresponding author. Division of Gerontology, Geriatrics and Palliative Care, Department of Medicine, University of Alabama at Birmingham, Birmingham, AL, USA.

E-mail address: cartercs@uab.edu (C.S. Carter).

opportunities may be exceptionally important for ECRs in these uncertain times in order to remain confident that they will be able to maintain their careers.

The aged are particularly vulnerable to the COVID-19 virus, making it crucial that aging researchers also keep moving forward to understanding the unique needs of the elderly and to keep fostering this important area of research. Indeed, the National Institute on Aging, in coordination with other institutes of the National Institutes of Health, is creating funding opportunities to promote rapid research on how to preserve the life and health of older adults. Thus, we, as an aging research community do not want to be hindered by this pandemic, but will endeavor to maintain our ability to make scientific progress towards this goal.

By engaging researchers in our field through virtual seminars, we hypothesized that we would be able to offset the negative effects of cancelled meetings and symposiums, even when we must follow social distancing guidelines. We established the program “Aging Science Talks: Science for the Community” rapidly using a “lean” approach, making use of existing Web 2.0 technologies that are broadly available to researchers at academic institutions to engage investigators interested in the basic biology of aging. Thus, the purpose of this short report is to provide an initial description of how this program was developed online using widely available Web 2.0 tools with freely available client software and that is supported by local institutions, allowing for rapid deployment and maximal participation in presentation and viewing across our academic field. Many researchers may be unaware of how these methodologies can be effectively utilized to establish a community of inquiry (CoI) [4,5] for sharing information. However, employing these readily available technologies allowed this program to grow exponentially over the last month. We also discuss limitations of this approach including “real time” participation “vs” creating an off-line CoI, as well as how isolating with families with children impact how much time we are able to spend in scientific endeavor both in real time and offline.

Our future hope is to evaluate how the program works to build engagement in Geroscience [1–3] using a scientific pedagogical approach to online learning known as a “community of inquiry” (CoI) [4,5]. We also hope to measure our success at enhancing the career development of ECRs, and to capture metrics including the comfort of participants in using these online tools, number of attendees, and to quantify how useful people found the community based upon methodology, resultant publications, grant applications and successful funding. Finally, this program is foundational in its approach, and may be applied across all scientific disciplines during times of uncertain to foster collaborative scientific pursuit and career development.

2. Program description and implementation

As discussed above, many meetings centered around the biology of aging were cancelled in a very short time window following the outbreak of COVID-19 in Europe and the United States. Like many scientists, Dr. Lamming immediately began to contemplate how this influenced not only his own plans for travel, but far more importantly the career development opportunities for his trainees. Specifically, 1) the La Jolla aging meeting was a space where his first graduate student, Nicole Richardson, was to interview with faculty members at the Salk for postdocs and present a poster; 2) UW Diabetes Day, a conference focused on this disease of aging, represented an opportunity for four lab members to present; and 3) the American Aging Association Annual Scientific Meeting was scheduled for June in Madison, and his entire lab was planning to attend, with Dr. Lamming as a speaker and four lab members planning to submit abstracts.

Dr. Lamming is active on *Twitter*, and while thinking and reading the discussions of many PIs about how COVID-19 was affecting their own labs, he was inspired by Dr. Philip White at Duke, who was starting to organize an online seminar series entitled “Metabolic Physiology in Isolation.” A number of other seminar series have subsequently also started, covering a wide range of fields.

Dr. Lamming started developing the online seminar series during the first week of social distancing in Madison, Wisconsin on March 14 (see Fig. 1 for a summary of web 2.0 tools [6] used). He decided that a seminar held roughly during “lunch-time” for the eastern and central time zones would be optimal, as this would permit engagement by researchers in Europe as well as most of the Western hemisphere. He initially solicited presenters via *Twitter*, as well as reaching out via email to a number of aging research colleagues. From the beginning, Dr. Lamming solicited engagement and participation from ECRs, and reaching out through *Twitter* helped. During this first day, Dr. Mair at Harvard reached out to offer help in organizing the program on day one, and he helped advertise through his *Twitter* contacts. Finally, Dr. Lamming set up a shared editable *Google* Sheet, and people who expressed interest in presenting in the series on *Twitter* or via email were sent a link to the *Google* sheet and asked to sign up for a talk slot and provide a title for their talk. When Dr. Christy Carter became aware of this program, she encouraged Dr. Lamming to write up a report of this program and offered to help based upon her expertise and knowledge of online education within the gerontology community.

Dr. Lamming initially decided to use a *WebEx* platform hosted by the University of Wisconsin-Madison. Reasons included the fact that the expected number of participants was likely too high for alternative cost-free options available to Dr. Lamming and Dr. Mair, as well as the availability of administrative assistance in administering the *WebEx* that Dr. Lamming had access to through the University of Wisconsin-Madison Department of Medicine. We hosted the program website at Dr. Lamming’s personal Lab Website, which provides a simple interface with links to the *WebEx* meeting, a *Google Calendar* of talks, and an “Aging Science Talks” FAQ written by Dr. Mair. The FAQ provides a friendly introduction, basic information for sign up to the various web tools (*Google* listserve sign up, *Calendar* and *Excel* sign up worksheet, *WebEx*). The Website also provides a link to the *Slack*, an integral part of the program and described below.

Dr. Lamming selected several methodologies for organizing the program. *GoogleDocs* was used to organize an *Excel* file so that potential presenters could sign themselves up for talks without the need for an intermediary. Dr. Mair created a shared *Google Calendar* which provides a reminder for people to participate and allows them to seamlessly integrate these reminders into their daily schedule. The whole processes was organic in nature, as presenters could choose for themselves from multiple dates that suited their schedule. Currently, anyone is allowed to sign up and give a presentation. Although some individuals asked to record the talks so that they could be viewed later, the program directors decided against this initially for technical simplicity as well as the potential reluctance of speakers to share cutting-edge research not ready for prime time. The first speaker sign up was advertised via the methods described above on March 14th, 2020. Dr. Lamming gave the first talk on March 18th, 2020.

An integral part of the seminar was the creation of a *Slack* community for online discussion, the brainchild of Dr. Mair. *Slack* is a workplace collaboration tool where people can talk with one another and foster collaboration. Using *Slack*, participants may also upload *Microsoft Word* documents, graphics, and more. The *Slack* community went online March 15th, 2020, covering the topics described in Fig. 2, and has now grown to over 1200 members. As managing virtual talks with “live” questions is very difficult, the

B. Organizational/Presentation Tools: *Google Cal*, *Zoom*



A. Awareness Tools: *Twitter*

The Lamming Laboratory for the Molecular Physiology of Aging and the Mair Lab
With support from the Glenn Foundation for Medical Research
Presents
Aging Science Talks: Science for the Community

Join the *Slack* for updates on presentations and post-talk questions and discussion with the presenter!
Link to *Google Calendar* of talks

United States	Daily at 10am PT, 12 CT, 1pm ET	Meeting Link for US talks	Webinar ID: 833-8631-0168 // Password: 778156
UK/EU	Mon Thur at 9am ET, 2pm BST, 3 pm CEST	Zoom link for UK talks	Webinar ID: 833-8631-0168 // Password: 778156
Asia/Pacific	Tuesday 11am AEST/9am SST/3am CEST/Monday 9pm ET/5pm PT	Zoom link for Asia/Pacific talks	Webinar ID: 833-8631-0168 // Password: 778156

Aging Science Talks FAQ.
Presenters: Please join 15 minutes in advance of your talk time. Please also sign up for the *slack* in advance questions will post in a dedicated thread.

C. Community building Tools: *Slack*

Fig. 1. Application of Web 2.0 Tools. We established the program “Aging Science Talks: Science for the Community” rapidly using a “lean” approach, making use of existing Web 2.0 technologies that are broadly available to researchers at academic institutions. Fig. 1 provides some examples of these tools. *Twitter* was used to raise awareness (A: with over 1200 followers to date). *Google Cal* was used to organize the scheduling and *Zoom* for the delivery of the presentations (B). *Slack* was used to build an interactive community. This [hyperlink](#) connects directly to the seminar series FAQ page for ease of access to these tools.

Slack plays an essential role in the question and answer session following each seminar. During and after the seminar, questions can be asked on the *Slack* in a dedicated channel, and member can “up-vote” selected questions using the thumbs-up emoji. One of the organizers or a member of the Dr. Lamming and Dr. Mair labs typically reads some of the top-rated questions; after 5–10 min, the online seminar wraps up, but the presenters can continue to answer questions in the *Slack* as long as they are able and interested.

3. Initial outcomes

As of the writing of this paper, approximately 59 speakers have signed up to give talks for 16 weeks. [Supplementary Table 1](#) provides a complete list of speakers, their affiliations and titles/dates of their presentations. We cut and pasted the titles of all the talks into <https://www.wordclouds.com/>; and as shown in Fig. 2A, the range of subjects was expansive. Fig. 2B demonstrates, that of the 59 presentations given or proposed, 41 (69%) represented ECRs. Speakers represent a total of 44 different institutions, 15 states in the US and 9 countries internationally (Brazil, Denmark, Finland, France, Germany, Netherlands, Switzerland, UK, USA).

Fig. 3 shows the progression in the numbers of attendees over time. Over the first 26 talks, which were presented using the *Webex* platform, the total number of attendees ranged from 257 to 695, for a mean and median number of participants per talk equaling 295 and 277, respectively. Thus the introduction to the series, hosted by Dr. Lamming and trainees from UW-Madison and Harvard, has captured the attention of nearly 700 individuals, demonstrating the need and interest for creating this online community. In addition, the number of attendees are holding steady, meaning that individuals doing research in the field of Geroscience are maintaining

their interest. Finally, there is little difference in attendance between talks given by ECRs and those given by more senior career-level presenters, ensuring continued outreach to a large and diverse community. Unofficial feedback of participants in the *Slack* and on *Twitter* has been overwhelmingly positive, with praise for the speakers, the organizers, and for the existence of the community feeling that this endeavor has inspired. The number of users on *Slack* has grown to a total of 1229 as of the beginning of May.

4. Discussion and future directions

Despite the ostensible connectedness of today’s world, we are all currently living in a time of literal isolation as we maintain social distancing to #bendthecurve on COVID-19. The ability to maintain a sense of community and the tremendous benefits of sharing of our latest research has been seriously hampered by the cancellation of virtually all face-to-face conferences and other meetings. The application of online technology to link the isolated biology of aging community provides a methodology to foster the dissemination of knowledge and keep us all connected and sharing our science. In particular, ECRs need to be able to stay connected with the community in order to keep developing their own research programs, generating new ideas, and identifying collaborators and mentors.

Using a “lean” approach, Dr. Lamming, with the assistance of Dr. Mair and trainees in the Lamming and Mair laboratories, has developed a successful methodology for creating an online community to substitute for some of the lost opportunities that face-to-face meetings normally provide. The methods are generally free or low-cost, in that most Universities support these Web 2.0 tools, or the tools are readily available to those with internet access. However, a variety of other options also exist at a higher cost; as an example, Dr. Lamming and Dr. Mair recently received support from

A. Topics of Presentations

B. Presenter Career Level

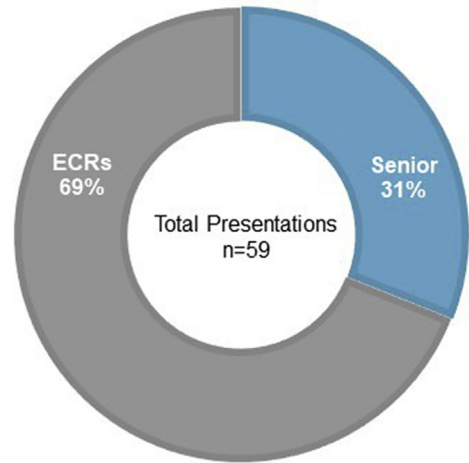
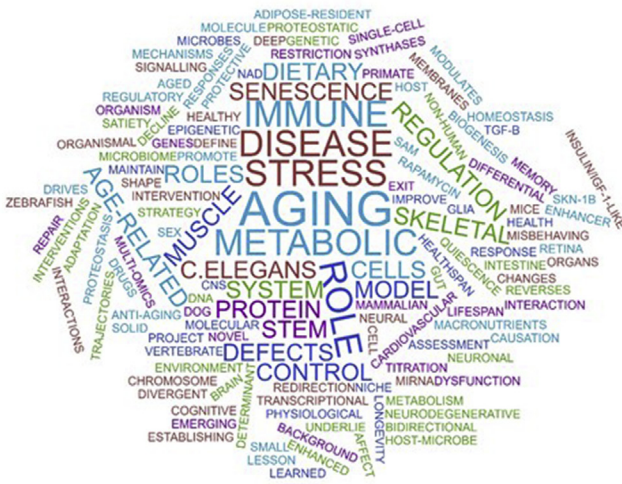


Fig. 2. Range of Topics and Presenters. We loaded titles of all the talks into <https://www.wordclouds.com/> to give a sense of the range of topics of talks for the “Aging Science Talks: Science for the Community” visually presented in A. In B, we demonstrate the range of presenters distinguishing Early Career Researchers (ECRs) “vs” Senior Investigators.

the Glenn Foundation for Medical Research to move this seminar series to a Zoom platform, enabling improved moderation as well as recording of seminars for those who are unable to join in real-time.

In the near term, we plan to continue these talks as long as we as a scientific community are asked to socially isolate, and to continue to innovate and expand using this new methodology to better serve

the global aging community and our newly established Col. As one recent example, Dr. Mair recently organized a Global Aging Science Talks event on May 5th, which involved talks by five leading aging researchers in the United States, Germany, Singapore, and Australia over an approximately 24 h period. Using the same hosting platform we have established, Dr. Mair and Dr. Lamming recruited

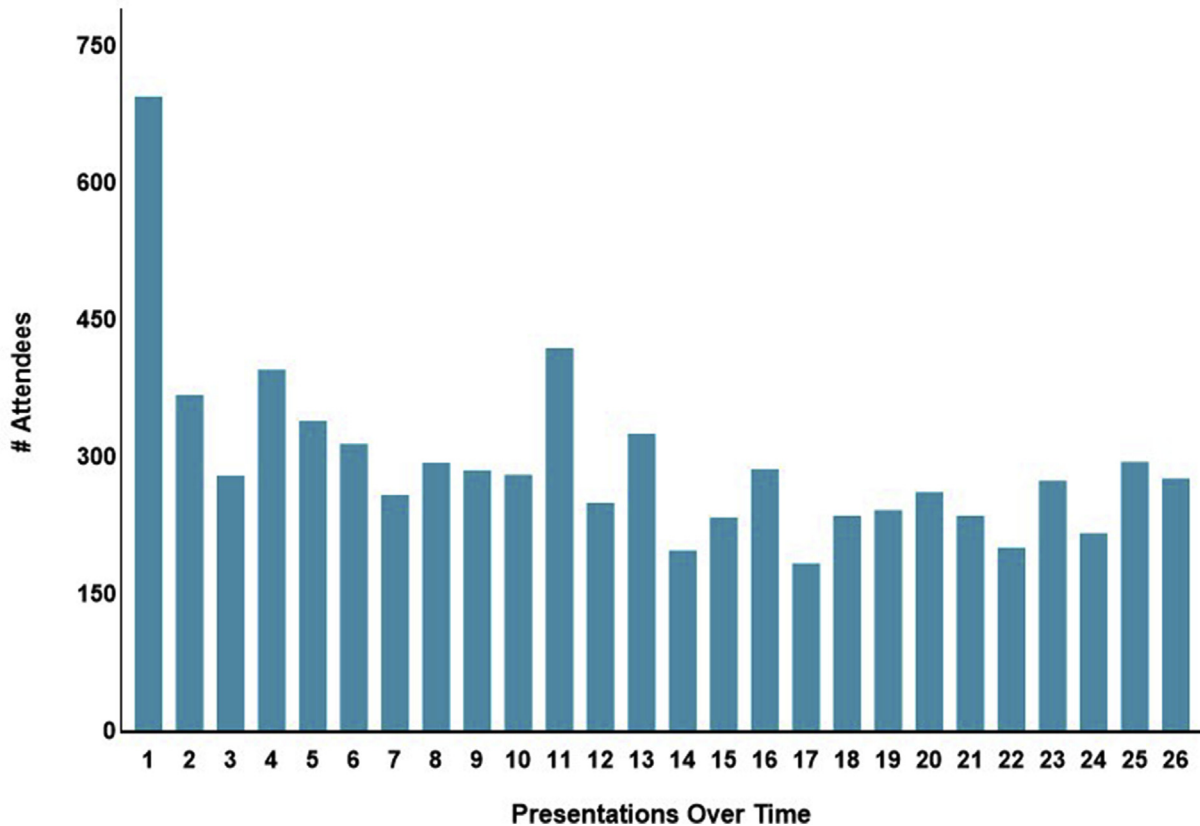


Fig. 3. Attendees in the “Aging Science Talks: Science for the Community”. The number of attendees in the seminar peaked with the first talk where Dr. Lamming presented the concept of the series demonstrating an enormous level of interest to this online seminar series. Thereafter, attendance has been consistent, around 270 participants.

collaborators in the UK and Australia to launch local versions of “Aging Science Talks” to better recruit trainees and ECRs in the European Union and the Asia/Pacific region, respectively. Additional future innovations may include mini-symposiums focused on specific topics, or themed seminars in support of career development and mentorship for ECRs.

A longer-term goal is to formally evaluate the success of our program. On the traditional level, we hope to assess metrics such as 1) ECRs attending and presenting; 2) collaborations established; 3) grants or papers submitted/funded/published based on collaborations established; 4) postdoc positions obtained. This could be easily achieved through linking a RedCap survey to our website and also soliciting participants.

Less traditional (for our field at least) is using established educational pedagogical tools to assess our ability, through the seminar, to create a scientific “Community of Inquiry” or Col [2]. A Col is defined as a group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding [1,7,8]. This framework represents an approach to creating a deep and meaningful (collaborative-constructivist) learning experience through the development of social, cognitive and teaching presences and for which there are established rubrics to evaluate our ability to create this Col [9].

For example, we created a social presence by establishing trust for our online community by providing rules on the site’s webpage to ensure that individuals felt safe sharing cutting-edge data and communicating in a respectful fashion. We allowed individuals to project their individual personalities by allowing nearly anyone, including ECRs, to give presentations thereby keeping our community open to many voices, albeit centered on Geroscience. We established a teaching presence [10] through our ability to efficiently make use of online tools such as *WebEx/Zoom/Google Docs* which allowed individuals to “show up” through video and ask question in real time while observing presentations. We established a cognitive presence, which enables learners to construct and confirm meaning through sustained reflection and discourse [11], using tools such as *Slack* to provide both real-time and off-line resources to allow individuals to create constructive discussion outside of the actual presentations and to continue conversation around the topic and build community for themselves. While this is a cursory discussion of a theoretical framework for online education, we look forward to using established tools for evaluating Col to also create science around this online educational experience.

Finally, while so far we focused on data presentations; other features of regular in-person scientific meetings could also be virtualized. These include happy hour discussions [12], online film festivals to curate and discuss relevant media for the Geroscience community [13], advice on parenting and work-life balance [14], and virtual fun runs [15]. Furthermore, through this creation of community we may be able to improve our ability to reach out and support those of our colleagues who are caring for older individuals suffering from COVID-19.

In summary, the “Aging Science Talks: Science for the Community” online seminar series, offered daily weekdays, has grown into one of the largest aging meetings, with average attendance rivaling those at many national meetings. This paper provides a roadmap for our field, and for other fields, to generate these communities in a relatively facile manner. While future analysis and time will allow us to fully assess if our community has succeeded in successfully substituting for an in-person meeting, and establishing a Col focused on Geroscience, the self-offered impressions of the organizers, speakers, and attendees is that this series has been very

valuable in helping to ameliorate the social and scientific impact of COVID-19.

Declaration of competing interest

The authors state that they have no conflicts of interest to report.

Acknowledgements

We would like to thank all of our colleagues who have participated in Aging Science Talks. We thank Dr. William Mair for co-organizing Aging Science Talks, and launching the *Slack* community, *Google Calendar* and @AgingSciTalks twitter account. During the initial *WebEx* phase of Aging Science Talks, we thank Sneha Dutta for maintaining the *Google Calendar*; Dr. Cara Green for helping to run the Q&A sessions; and Esther Schulman for helping to host and moderate the *Webex* sessions. We thank the Glenn Foundation for Medical Research for enabling the future of Aging Science Talks by helping us to transition to *Zoom*, and we also thank all of the trainees and collaborators not mentioned here who are involved in the transition to *Zoom* and the launch of UK/Australia focused sessions.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tma.2020.05.002>.

References

- [1] D.R. Garrison, Online community of inquiry review: social, cognitive, and teaching presence issues, *OLJ* 11 (1) (2019 Feb 11) 61–72.
- [2] J.B. Arbaugh, M. Cleveland-Innes, S.R. Diaz, D.R. Garrison, P. Ice, J.C. Richardson, et al., Developing a community of inquiry instrument: testing a measure of the Community of Inquiry framework using a multi-institutional sample, *Internet High Educ.* 11 (3–4) (2008 Jan) 133–136.
- [3] C.S. Carter, L.B. Solberg, L.M. Solberg, Applying theories of adult learning in developing online programs in gerontology, *Jnl of adult & cont edu* 23 (2) (2017 Nov) 197–205.
- [4] F. Sierra, R. Kohanski, Geroscience and the trans-NIH geroscience interest group, *GSIG. Geroscience.* 39 (1) (2017) 1–5.
- [5] B.K. Kennedy, S.L. Berger, A. Brunet, J. Campisi, A.M. Cuervo, E.S. Epel, et al., Geroscience: linking aging to chronic disease, *Cell* 159 (4) (2014 Nov 6) 709–713.
- [6] D. DiNucci, Fragmented future, *Print* 53 (4) (1999 Jan 1) 32.
- [7] K. Garth-James, B. Hollis, Connecting global learners using eLearning and the community of inquiry model, *EDUCATION* 2 (8) (2014 Aug 3) 663–668.
- [8] T. Anderson (Ed.), *The Theory and Practice of Online Learning*. Illustrated, Athabasca University Press, 2008.
- [9] D.R. Garrison, M. Cleveland-Innes, T.S. Fung, Exploring causal relationships among teaching, cognitive and social presence: student perceptions of the community of inquiry framework, *Internet High Educ.* 13 (1–2) (2010 Jan) 31–36.
- [10] L. Rourke, T. Anderson, D.R. Garrison, W. Archer, Methodological issues in the content analysis of computer conference transcripts, *Int. J. Artif. Intell. Educ.* 12 (2001) 8–22.
- [11] D.R. Garrison, T. Anderson, W. Archer, Critical thinking, cognitive presence, and computer conferencing in distance education, *Am. J. Dist. Educ.* 15 (1) (2001 Jan) 7–23.
- [12] How to Have a Successful Virtual Happy Hour, *The New York Times* [Internet]. [cited 2020 Apr 28]. Available from: <https://www.nytimes.com/2020/03/20/well/virus-virtual-happy-hour.html>.
- [13] The Best Online Film Festivals and Virtual Art House Movie Screenings, *TechHive* [Internet]. [cited 2020 Apr 28]. Available from: <https://www.techhive.com/article/3535799/online-film-festivals-and-art-house-movie-screenings.html>.
- [14] Tips for Handling Work and Kids during COVID-19 Isolation, *Live Science* [Internet]. [cited 2020 Apr 28]. Available from: <https://www.livescience.com/coronavirus-tips-for-homebound-kids-parents.html>.
- [15] The Rise of Virtual Races, *The New York Times* [Internet]. [cited 2020 Apr 29]. Available from: <https://www.nytimes.com/2020/04/04/well/move/the-rise-of-virtual-races.html>.