

A new era and future of education: the impact of pandemic on online learning – a study from the European School of Urology

Juan Gómez Rivas^{1,2*}, Inés Rivero Belenchón^{1,3*}, Nan Li⁴, Bhaskar Somani⁵, Eva Andres Esteban⁶, Giovanni Cacciamani^{1,7}, Enrico Checcucci^{1,8}, Stefano Puliatti^{1,9}, Mark Taratkin^{1,10}, Karl-Friedrich Kowalewski^{1,11}, Severin Rodler^{1,12}, Alessandro Vecchia^{1,13}, Joan Palou¹⁴, Evangelos Liatsikos¹⁵ on behalf of the European School of Urology and the EAU-Young academics urologists

¹Young Academic Urologist-Urotechnology Working Party (ESUT-YAU), European Association of Urology, Arnhem, the Neatherlands

²Department of Urology, San Carlos Hospital, Madrid, Spain

³Department of Urology and Nephrology, Biomedical Institute of Seville (IBiS), Virgen del Rocío University Hospital, University of Seville, Seville, Spain

⁴European Association of Urology, Arnhem, the Neatherlands

⁵University Hospital Southampton NHS Trust, Southampton, United Kingdom

⁶Statistics Department, Rey Juan Carlos University, Madrid, Spain

⁷Catherine and Joseph Aresty Department of Urology, US Institute of Urology, University of Southern California, Los Angeles, United States of America

⁸Division of Urology, Department of Surgery, IRCC Candiolo Cancer Institute, Candiolo, Turin, Italy

⁹Department of Urology, University of Modena and Reggio Emilia, Modena, Italy

¹⁰Institute for Urology and Reproductive Health, Sechenov University, Moscow, Russia

¹¹Department of Urology, University Medical Center Mannheim, University of Heidelberg, Mannheim, Germany

¹²Department of Urology, Klinikum der Universität München, Munich, Germany

¹³Urology Unit, Azienda Ospedaliera Universitaria Integrata Verona, Verona, Italy

¹⁴Department of Urology, Fundació Puigvert, Universitat Autònoma de Barcelona, Barcelona, Spain

¹⁵Department of Urology, University Hospital of Patras, Patras, Greece

*both contributed as first authors

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Corresponding author

Inés Rivero Belenchón
San Carlos Hospital
Department of Urology
Calle professor
Martín lagos S/N
28040 Madrid, Spain
ines.rivero.belenchon@gmail.com

Introduction In contemporary times, the online learning process has become indispensable for healthcare education. In this direction, the European School of Urology (ESU) has taken the challenge to implement new technologies to bring down knowledge barriers. Web-based seminars (webinars) are one of the tools that help us move towards such inclusivity, and in front-facing COVID-19 pandemic, when face-to-face meetings were forbidden.

Material and methods Data from ESU webinars was collected from 2016 to 2022. We described the trends through years of: a) number of webinars per year; b) number of oncological versus non-oncological webinars per year; c) number of registrations per year; d) attendance rate; e) YouTube visualisations. We also analysed audience demographics and COVID-19 impact.

Results We found a 60% increase in webinars launched per year with a trend towards more non-oncological webinars. A 94% rise in the number of registrations and an 85% increase in the attendance ratio from 2016 to 2022 was observed. The mean YouTube visualisations per webinar decreased over 200%. Among registrations, we had a 3:1 male: female ratio, 53% were older than 40, and a 51% were of European precedence. COVID-19 positively impacted webinars with a remarkable increase on the amount of webinars launched, number of registrations and attendance ratio.

Conclusions Webinars are a powerful tool to spread healthcare knowledge, bridging the gap in medical educational access. COVID-19 was a determinant that reinforced its implantation, but our data show that this new learning tool had a positive uptake, and has come to stay.

Key Words: webinar ↔ online education ↔ urology ↔ COVID ↔ Europe

INTRODUCTION

Education is the wise and respectful cultivation of learning [1], and the art of translating it to health-care understanding and implementation is medical education. This area of knowledge has traditionally been characterised by long-established pedagogical methodologies, including face-to-face lectures [2], physical training, in-person meetings and individual learning. However, this approach to education comes inevitably with travelling, congress fees, book purchases, accommodation and time taken; it is heavily synchronous, face-to-face and employs apprenticeship models of education with core features of placement attendance [3]. Altogether, it has generated learning inequalities and a deep gap in medical educational access due to cost and accessibility for all. In conjunction with the explosion of digital information, there is anxiety and eagerness to adopt new and emerging technologies in education [4]. In that sense, communication technology has become an integral part of knowledge exchange [5]. The objective is to make learning ubiquitous, overcome possible economic inequalities, reach more people and disseminate knowledge in a fairer more objective way. Webinars (web-based seminars) are one online communication tool that facilitates the delivery of scientific information and sharing experiences among physicians, allowing real-time interaction with speakers and participants. Webinars provide an opportunity to take the meetings to an online portal using a video conferencing system [5]. This online educational tool became more popular during the COVID-19 pandemic when movement restrictions and fear of a potentially fatal virus infection invaded our society.

Since its creation, the European School of Urology (ESU), the educational arm of the European Association of Urology (EAU), took the challenge to renew medical learning practices and is working towards its educational commitment. As a result, the ESU online learning platform appeared in 2014 and now offers hundreds of free e-courses and webinars that reach thousands of urologists each year. Specifically, ESU webinars started in 2016 and quickly spread among urologists through emails, social media and the www.uroweb.org website, becoming specially popular during COVID-19 pandemic [6]. In the ESU online learning platform, webinar registrations and attendance have been recorded since 2016 to analyse participation data. This paper aims to evaluate participation trends in online education using webinars as a tool to know the audience, their needs and help develop new educational strategies for the years to come.

MATERIAL AND METHODS

European School of Urology method to launch Webinars

Webinars were announced in the EAU website and by email to all EAU members.

In addition, all webinars were recorded and could be visualised by all users in YouTube. Full information about how to visualise the content in YouTube was given by the ESU to those who registered for a webinar.

Data retrieval

We collected all available data regarding ESU webinars from April 2016 until April 2022. Data was retrieved from two online platforms: GoToWebinar® and Zoom®. GoToWebinar was used from April 2016 until December 2020 and Zoom from January 2021 to date. These platforms gave us data from the number of registrations for each webinar, the number of webinars per year, the webinar topic and the attendees' demographic data (age, gender, nationality, EAU membership). Both platforms had a privacy policy that users knew and that ensured users' identity protection. In addition, all users were identified with a code during data analysis to minimise the risk of reidentification.

The number of YouTube visualisations was directly given by this platform in its website.

Study design

Firstly, we performed a general descriptive analysis of webinars from April 2016 until April 2022. Then, we analysed and explored the trends through years of: a) number of webinars per year; b) number of oncological versus non-oncological webinars per year; c) number of registrations per webinar and per year; d) attendance rate; and e) YouTube visualisations.

Audience demographics could only be described and trends analysed from January 2020 until April 2022, because no data were available from the previous years as the platform used for streaming only kept data for 12 months. However, with the available data we described: a) gender; b) age; and c) nationality.

Finally, an analysis describing the impact of the COVID-19 pandemic on webinars registrations was performed. We compared the number of webinars per year, the percentage of oncological webinars, the number of registrations, the attendance ratio and the YouTube visualisations before and after COVID-19 pandemic.

Statistical analysis

Qualitative variables were expressed as absolute frequencies and percentages, whereas quantitative variables were expressed as mean values and standard deviations. Given the large sample size and according to the central limit theorem, we considered our sample that follows a standard normal distribution. Therefore, data were represented in contingency tables and analysed using Fisher's exact test or chi² test for qualitative variables and variance analysis or Student's t-test for quantitative variables. All statistical analyses were performed using the software package IBM SPSS 22.0 (SPSS. Inc., Chicago, IL).

RESULTS

1. Webinars on the European School of Urology online platform

From April 2016 until April 2022, 133 webinars were launched.

Table 1 shows the detailed data per year.

Webinars per year

The number of webinars per year increased considerably over the time: we found 6 to 7 webinars per year from 2016 until 2019, and experienced exponential growth after that, with 31 webinars in 2020, 61 in 2021 and 15 in the first quarter of 2022 (Figure 1A). That means that the increase in webinars from 2016 until 2022 was 60.0% (95% CI: 51.3–68.5%).

Oncological versus non-oncological webinars

Regarding the webinar topics, the trend over the years is towards an increased rate on non-oncological webinars. In fact, the number of oncological webinars had a mean decrease through years of 34.6% (95% CI: 21.5–48.2%) (Figure 1B).

Table 1. Webinars 2016–2022

	N Webinars	N Oncological/ non-oncological	N Registrations: total/ per webinar	N Online attendees total/ per webinar	Attendance rate per webinar	N YouTube visualisations total/ per webinar
From April 2016	6	3/3	2381/ 397	805/ 134	33.8%	58494/ 9749
2017	6	2/4	1826/ 304	613/ 102	33.6%	12510/ 2085
2018	7	4/3	2511/ 359	767/ 110	30.7%	7574/ 1082
2019	7	3/4	3567/ 510	1134/ 162	31.7%	38699/ 5528
2020	31	12/19	31456/ 1015	12734/ 411	40.5%	46508/ 1500
2021	61	26/35	41568/ 681	19425/ 318	46.7%	41632/ 682
Until April 2022	15	3/12	8309/ 554	4102/ 273	49.3%	6668/ 445

Number of registrations per year

The total number of registrations to all the webinars during the study period increased to 91618 from 18433 persons. The number of total registrations improved by 94.3% (95% CI: 93.5–94.6%) from 2016 until 2022. The expected number for 2022, if the trend continues, is 33236 (Figure 1C).

Attendance ratio

The mean attendance ratio, meaning the completion of the webinar, was 38.04%. Over the years, this attendance ratio increased by 85.1% (95% CI: 84.7–85.4%). In 2016 the attendance rate was 33%, while in 2022 the attendance rate was almost 50% (Table 1, Figure 1D).

Dividing the webinars into topics: oncological vs non-oncological, in the last 3 years, we found that the mean attendance rate in the oncological webinars was 44.20% (95% CI: 41.80–42.80%) while in non-oncological webinars was 45.51% (95% CI: 45.01–45.81%) ($p < 0.001$) (Figure 1B).

Number of YouTube visualisations

Over the years, the number of YouTube visualisations per webinar decreased by 205.5% (95% CI: 204.3–205.8%). As we can see in the graphic, the mean visualisations per webinar decreased from almost 10000 in 2016 to only 1400 in 2021 (Figure 1E). However, this could be affected by the online exposure time and other forms of visualisation portals.

2. Audience demographics

Registrations

We had a total of 18433 persons who registered at least once for a webinar between April 2016 and April 2022. Most of them were males (male:female

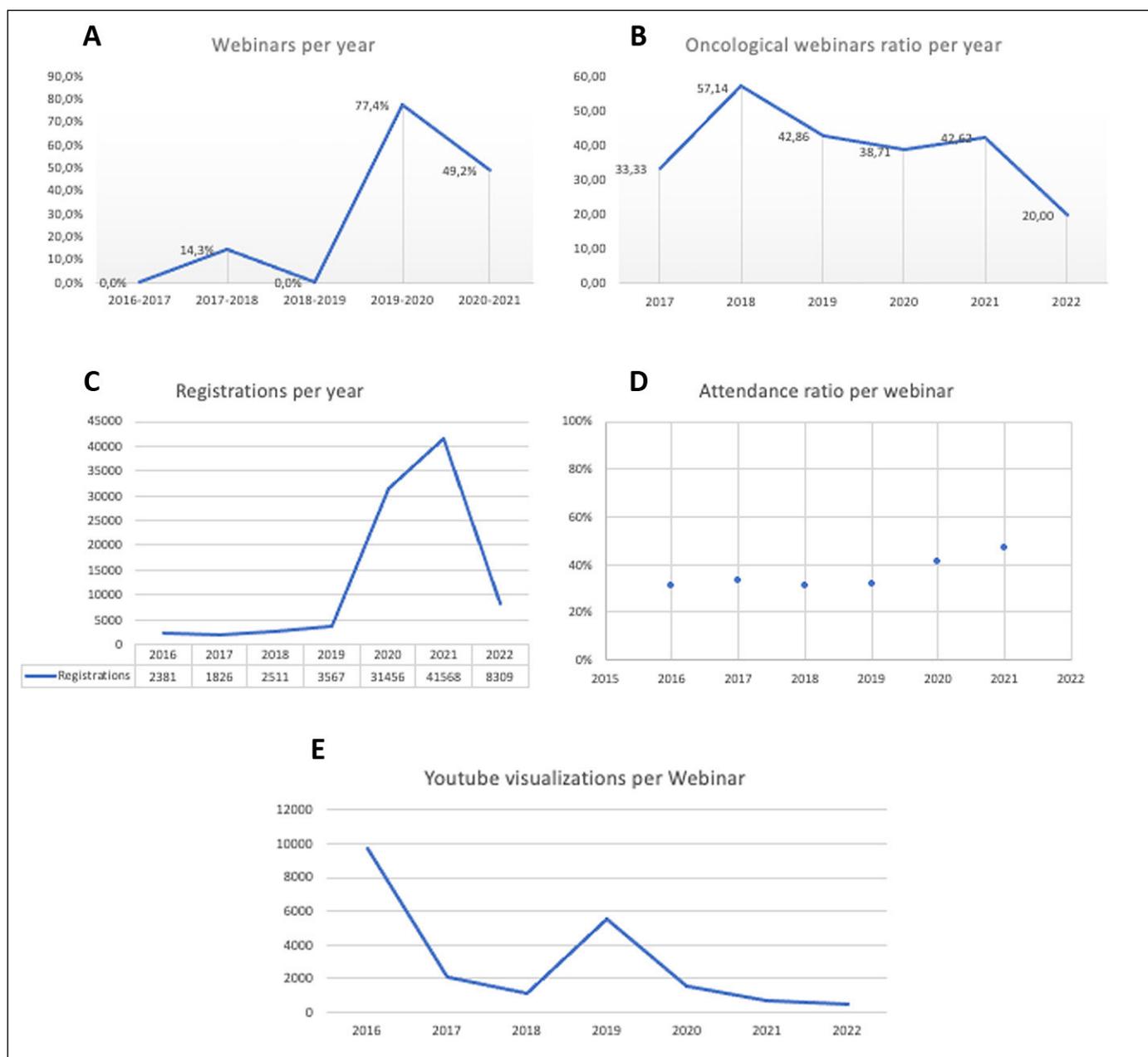


Figure 1. Webinars on the European School of Urology online platform.

ratio 3:1), although the proportion of females increased 126% in the last 3 years. In 2020 the percentage of females was 15%; in 2021, 17% and 2022, 19%. Considering age, 24.25% (95% CI: 23.63–24.87%) were between 30 and 40 years of age, 53.03% (95% IC 52.53–53.63%) were older than 40 years, and 10.25% (95% IC 9.75–10.75%) older than 60. Regarding the EAU membership, only 38.72% (95% CI: 37.98–39.46%) of users were EAU/EAUN members. Most users, 51.50% (95% CI: 50.79–52.31%) were European, the majority from United Kingdom, Spain, Germany and Italy (20.25% 95% CI: 19.64–20.86%).

The second most represented continent was Asia, with 21.23% (95% CI 20.87–21.48%) of users.

Attendees

Regarding the attendance to the webinars, meaning to attend at any point regardless of the completion of it, we had a mean attendance ratio of 52.98% (95% CI: 52.57–59.23%). Splitting by gender, we had a 52.28% (95% CI: 51.03–53.52%) ratio among females and 53.06% (95% CI: 52.49–53.63%) among men ($p = 0.269$). Considering nationality, we found

more attendance rates in European (56.50%) (95% CI: 56.25–56.97%) than non-European people (43.50%) (95% CI: 43.14–43.85%) ($p = 0.565$). About age distribution, the highest completion rates were in young people between 20 and 40 years (53.22%, 95% CI: 52.48–53.96%) vs (52.03%, 95% CI: 51.25–52.81%) in people older than 40 years ($p = 0.029$).

Demographics on webinars topics: oncological vs non-oncological

We found that in non-oncological webinars the proportion of registered young people (below 40 years old) was higher 36.72% (95% CI: 25.78–47.76%) than in the oncological webinars at 34.92% (95% CI: 21.52–48.47%) ($p < 0.001$). Regarding gender, the proportion of males registered to non-oncological webinars was higher 83.55% (95% CI: 80.49–82.88%), than in the oncological ones 82.03% (95% CI: 81.26–82.27%), ($p < 0.001$). Concerning precedence, the proportion of European people in oncological webinars was higher 58.79% (95% CI: 57.72–59.66%), than in non-oncological ones at 55.08% (95% CI: 53.82–56.89%) ($p < 0.001$). These results showed that in oncological webinars, the demographic trend was towards older people, females and European nationals; meanwhile, in non-oncological webinars, the trend was towards younger people, males and non-European nationals (Table 2).

3. Analysis of the impact of the COVID-19 pandemic

From 2016 until 2020, we had a mean amount of 6.5 (SD: 0.57) webinars per year, while during COVID-19, we had 35.7 webinars (SD: 23.4) ($p < 0.001$). The percentage of oncological webinars before the pandemic was 46.2%, while during COVID-19 it was 38.2% ($p = 0.464$).

Before COVID-19, the mean number of attendance per year was 829.7 (SD: 218.7), and during COVID-19 it was 12086.9 (SD: 7681.4) ($p < 0.001$) with a mean attendance ratio per webinar of 126.9 (SD: 26.99) that reached up to 334.2 (SD: 69.98) during COVID-19 ($p = 0.057$).

Regarding YouTube visualisations, we had 29319.2 (SD: 23766.3) before the pandemic and 31602.7 (SD: 21731.5) during the pandemic ($p = 0.989$).

DISCUSSION

Since stepping into the digital world, technological advances have provided new education platforms, and webinars have gained popularity with health

professionals [7]. Therefore, our results reflect an increasing number of webinars launched per year, of 60%, with a trend towards more non-oncological webinars. This may be a consequence of an interest to offer a wider range of content during COVID-19. In addition, a corresponding rise in registrations and attendance ratio of 94% and 85% respectively, from 2016 to 2022. This trend may last for the years to come, as the youngest generations are very interested in webinars, as showed by a global survey performed during COVID-19 pandemic with residents along the world [8].

Diving into our demographic data, urology seems a 'male' speciality, which is in line with the current distribution of urologists and urologists residents through the world [8, 9]. However, trends are changing. Our analysis shows that the proportion of females registered to webinars is increasing yearly, with a mean increasing rate of 2% annually, perhaps in reflection to the changing gender trends in urology. Regarding age, something quite surprising was that most registrations corresponded to people older than 40 (53%), and above 60 years old were 10% of all registrations, meaning that online learning is not limited to young people and that those above 60s are still interested in it. This is consistent with the reported data in the literature, where the mean age is above 40 years old [7].

Talking about geographical location, we found that more than half of the users were European (51%), and the second most represented continent was Asia, with more than 20% of all registrations. This result agrees with a survey performed among urologists through the world where the most represented countries came from Europe, Asia and North America [8]. These statistics should help us pay attention to our Asian colleagues and adjust some topics and time schedules to facilitate their participation in the ESU online platform. On the other hand, we should consider expanding our influence in Africa and America too, where we have the lowest registration data. In that sense, a survey to know their interests and expectations on an online platform, and more intense publicity through emails, social media [4] and congress advertisements, may be helpful.

Table 2. Oncological vs non-oncological webinars

	Oncological webinars	Non-oncological webinars	p
<40 years vs >40 years	34.92% vs 65.08%	36.72% vs 63.28%	0.001
Males vs Females	82.03% vs 17.97%	83.55% vs 16.45%	0.001
European vs Non-European	58.79% vs 41.21%	55.08% vs 44.92%	0.001

Focusing on the attendance ratio, we can proudly say that in 2022 we have almost a 50% attendance ratio. This proportion is considered a very high participation ratio, as the general average attendance ratio to webinars is 30–35% [5]. Analysing our demographic data, we did not find a remarkable difference in attendance ratios according to gender, precedence, or age. What is very interesting is that our attendance ratio has increased by 85% through the years. Factors that could have affected it are: 1) the COVID-19 pandemic, 2) the improvement in webinars notifications and reminders through emails and social media, 3) the covering of more popular and fast-changing topics; 4) the use of a more user-friendly platform with a higher quality of video and audio. This trend will probably continue in the coming years even if the COVID-19 is no longer so prevalent, perhaps coexisting with face-to-face learning methods [9]. This was requested by an overwhelming majority of residents in the United States, in a survey performed this year [10].

However, what is clear is that the COVID-19 pandemic has accelerated the learning via digitalisation process [7]. Most courses and congresses were forced to close face-to-face meetings and move online during the pandemic. In this context, webinars have been beneficial to continue the healthcare education process in this scenario of social distancing [11], and our results support it. Before COVID-19, the mean number of webinars per year was 6.5, while during the pandemic, it rose to 35.7. The mean registration number during the pandemic was also duplicated, and the attendance ratio was three times greater. Finally, webinars and YouTube visualisations were also higher during this time.

Our data, still, should be taken carefully as there are some limitations. Firstly, it is a retrospective analysis which could have led us to some inaccuracy. Secondly, demographic data from the first platform used (GoToWebinar®) was lost, which limited our demographic analysis to only two years. Finally, the impact of the 'return to normality' after the COVID-19 pandemic, is not well measured,

as the analysis stopped before 2022 summer when the real change occurred.

Nevertheless, our study has the value to be the first analysis of the ESU webinars data and to have balanced the COVID-19 pandemic impact. Furthermore, it opens the door to further studies on other ways of online education as E-Courses, that also experienced a remarkable growth through the last years. Our future perspective is to put all this data together and analyse the impact of E-Learning on the preservation of our planet, thereby also focusing on the reduction of our carbon footprint.

This era has shifted online content production from internal and informal learning sessions to large-scale presentations with invited speakers and national (or even international) publicity. The major benefit of such webinars is the availability of high-level content to anyone with internet access [11]. But now that this technology has been successfully implemented, it is time to incorporate new elements in the online learning structure and training of the EAU [12, 13, 14], such as mobile apps, podcasts, virtual and augmented reality [15], 3D printing [16], remote live surgery [17] big data and artificial intelligence [18] among others. In that sense, ESU is making a considerable effort to renew learning processes and implement new technologies [19, 20]. In addition, these new learning methodologies could be translated to undergraduate education for urology in Europe [21].

CONCLUSIONS

In conclusion, webinars are a powerful tool to spread healthcare knowledge, bridging the gap on educational access. Our data show a trend towards a comprehensive implementation of this technology, with a remarkable increase in the number of webinars launched by the ESU and a corresponding increase in the participation ratio. COVID-19 was a determinant for its implantation, but this new learning tool has had a positive uptake and impact, and has come to stay.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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