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Future Research: Trends and Skills for the Scholars

[1]Dr S R Chitra, [2]Dharmar Sudha, [3]Dr.R Murugeswari, [4]Dr. N Sasirekha, [5]Dr. N Selvalakshmi

[1]Head, Department of Physics, P.K.N Arts & Science College, Thirumangalam, Madurai, Tamilnadu in India
[2]Head, Department of Physics, Mangayarkarasi College of Arts & Science for Women, Paravai, Madurai, Tamilnadu in India, sudhamcwphysics@gmail.com
[3]Assistant Professor, Department of Physics, NMS. S. Vellaichamy Nadar College, Nagamalai, Madurai, Tamilnadu in India, murugeswari2015@gmail.com
[4]Guest Lecturer, Department of Zoology, Government Art's and Science College for Women, Sivagangai, Tamilnadu in India, smartsasi12@gmail.com
[5]Assistant Professor, Department of Commerce, Mannar Tirumalai Naicker College, Madurai, Tamilnadu in India, vivekan2006@gmail.com
Corresponding author's E-mail id: jaicitra@yahoo.co.in

ABSTRACT

Technological encroachments have made it easier than yet for research groups to entrée huge amounts of information. However, with this data surplus comes the confront of organization, examining, and reporting on the statistics. Encroachments are gradually more relying on proficient researchers and research analysts to twist these bulky amounts of data into information they can utilize to make tactical results that will completely impact business operations. A researcher may focus on areas like unemployment, conducting interviews and surveys to collect data for analysis. An operations research analyst can help his or her organization by reviewing processes and identifying efficiencies, while a research analyst may make creation references after examining patterns. The educational necessities for research jobs also differ by diligence and the positions and errands of the place. In spite of an exact role or training, skilled researchers require understanding the up-and-coming trends and novel procedures in this field to stand out in their careers. Here's what researchers should understand about upcoming research trends, the main discussion has predictive analytics and future trends. They refer to a classy form of analysis using present and chronological data to predict future outcomes. Also researchers should to remain side by side of this cutting-edge form of analytics because of its increasing practice and progressions in digital tools carry on to modify the way researchers work. In reality, it can be a face for researchers to stay up-to-speed with the innovative resources available to them. Here are discussing about few digital tools and trends that support and simplify the work of researchers.

TRENDS AND SKILLS - FUTURE OF RESEARCH

Technological advancements have made it easier than ever for organizations to access large amounts of data. However, with this information overload comes the challenge of managing, analyzing, and reporting on the data. Organizations are increasingly relying on professional researchers and research analysts to turn these large amounts of data into information they can use to make strategic decisions that will positively impact business operations.

CAREER OUTLOOK FOR RESEARCHERS

Career opportunities in the research field are diverse and span a variety of industries. A social science researcher may focus on areas like healthcare and unemployment, conducting interviews and surveys to collect data for analysis. In a corporate environment, an operations research analyst can help his or her organization by reviewing business processes and identifying efficiencies, while a market research analyst may make production recommendations after examining consumer purchasing patterns.

The educational requirements for research jobs also vary by industry and the roles and responsibilities of the position. Most professional researchers have a bachelor's degree in market research or a related field, such as a Bachelor of Arts degree in Liberal Studies. Senior-level research positions typically require a graduate degree such as a master's in business administration.

NEW TRENDS AND TECHNIQUES FOR RESEARCHERS

Regardless of specific role or training, professional researchers need to understand the emerging trends and new techniques in this field to excel in their careers. Here's what researchers should know about future research trends.

- **Predictive Analytics**

Predictive analytics refers to a sophisticated form of analysis using current and historical data to forecast future outcomes. Although using analytics to draw predictions about the future is not a new practice, predictive analytics is at the forefront of data analysis because of the advanced techniques involved. Some of the tools used in this practice include machine learning, artificial intelligence, data mining, and statistical and mathematical algorithms. These advanced tools and models allow for the creation of more accurate and dependable future predictions of trends, behaviors, and actions.

Because accurate future studies and forecasting are essential to most business models, researchers with predictive analytics experience are in demand. The valuable information generated by predictive analytics can be used by organizations to make strategic decisions about operations and identify opportunities and risks. For example, the financial services sector could use this practice to forecast market trends or create credit risk reports. Or government and law enforcement agencies may look to gather data about community crime and use that information to develop proactive safety measures.

Researchers need to keep abreast of this cutting-edge form of analytics because of its increasing usage. According to a report by Zion Market Research, the predictive analytics market in 2016 was valued at approximately $3.49 billion and is expected to continue to grow.

- **Digital Tools**

Advancements in digital tools continue to change the way researchers work. In fact, it can be a challenge for researchers to stay up-to-speed with the new resources available to them. Here are just a few digital tools and trends that support and simplify the work of researchers:

1. **Search faster and easier.** Researchers can spend less time searching for the right information by using search engines and curator sites such as CiteULike, Google Scholar, and LazyScholar.
2. **Manage and share data.** Code and data sharing are becoming more common among researchers, with sites like Code Ocean and Datahub providing data management, storage, and sharing.
3. **Manage references.** Sites such as EndNote and CitationStyles help researchers electronically manage their bibliographies, citation styles, and references.
4. **Connect with fellow researchers.** Sites such as Academia and Addgene help researchers get expert advice and identify opportunities to collaborate or share findings.

- **Data Visualization**

From the widespread use of infographics in educational materials to storytelling on social media platforms through video and pictures, there is a clear trend toward more frequent visual communication in society. When applied to data analytics, visualization is the term often used to describe the practice of taking standard data and statistics and displaying them in a visually creative way.

Researchers who want their analysis effectively communicated should take note of this trend. For example, a simple research report that presents the findings in a large numerical spreadsheet may be hard to understand and confusing to the average person. If that same information was displayed in a graphic chart or by telling a story with images, readers would more likely have a clearer picture and understanding of the report's main points.

Researchers who want to implement this trend in their practice should:

1. Consider the visual options available — whether it's an infographic, chart, or slideshow
2. Focus on their audience and the key messages they need to convey
3. Remember to ensure the visual will highlight the actual data instead of serving as a distraction

IMPORTANT CANGES IN THE RESEARCH ENVIRONMENT SINCE 1992

- **Information Technologies in Research**

The continued exponential rise in the power of information and computing technologies has had a dramatic impact on research across many disciplines. These technologies have not only increased the speed and scope of research but have made it possible to conduct investigations that were not possible before. Information technology advances have enabled new forms of inquiry such as those based on numerical simulation of physical and biological systems and the analysis of massive datasets to detect and assess the nature of relationships that otherwise would go unseen.

The contrast in computing capabilities since the publication of Responsible Science is especially stark. In 1992, use of e-mail was less than a decade old, and the World Wide Web had just been invented and was not widely known. Three-and-a-half-inch floppy disks for data storage had replaced 5-1/4-inch disks just a few years before. People made telephone calls on landlines, used letters to communicate in writing, and circulated preprints via the postal system. For young researchers, the circumstances in which research was conducted in 1992 are almost entirely foreign.

One effect of information technologies in many areas of research has been to introduce intermediate analyses of considerable complexity between the "raw" data gathered by sensors and observations, and produced by data-creating devices such as DNA sequencers, and the results of research. Re-creating the steps from data to results can be impossible without a detailed knowledge of data production and analyzing software, which sometimes is dependent on the particular computer on which the software runs. This intermediate analysis complicates the replication of scientific results and can create opportunities to manipulate analyses so as to achieve desired results, as well as undermine the ability of others to validate findings.

Digital technologies can pose other temptations for researchers to violate the standards of scientific practice. For example, the manipulation of images using image-processing software has caused many journals to implement spot checks and other procedures to guard against falsification. The inappropriate application of statistical packages can lead to greater confidence in the results than is warranted. Data-mining techniques can generate false positives and spurious correlations. In many fields, the development of standards governing the application of technology in the derivation of research results remains incomplete even as continuing technological advances raise new issues. In a recent paper, two prominent biologists wrote, "Although scientists have always comforted themselves with the thought that science is self-correcting, the immediacy and rapidity with which knowledge disseminates today means that incorrect information can have a profound impact before any corrective process can take place" (Casadevall and Fang, 2012).

The widespread utilization of information technologies in research may also introduce new sources of unintentional error and irreproducibility of results. A survey of researchers who utilize species distribution modeling software found that only 8 percent had validated the software they had chosen against other methods, with higher percentages relying on recommendations from colleagues or the reputation of the developer (Joppa et al., 2013). The latter approaches pose risks of incorrect implementation and error for the research being pursued, particularly if software is not shared or subjected to critical review.

Besides affecting the conduct of research, information and communication technologies have transformed the communication of scientific results and interactions among researchers. In theory, if not always in practice, all the data contributing to a research result can now be stored electronically and communicated to interested researchers. This capability has contributed to a growing movement for much more open forms of research in which researchers work collectively on problems, often through electronic media (Nielsen, 2012). However, this trend toward greater transparency has created tasks and responsibilities for researchers and the research enterprise that did not previously exist, such as creating, documenting, storing, and sharing scientific software and immense databases and providing guidance in the use of these new digital objects. For example, software produced by scientists in the course of analyzing the data is often carried out as a collaborative online process. This digitization makes it easier than ever to perform very complex analyses that not only lead to new discoveries but create new problems of opacity for the peer review process. And while technology is making many aspects of research more efficient, it may also create new tasks and responsibilities that are burdensome for researchers and that they may find difficult or impossible to fulfill.

The movement toward open science has encouraged the efforts of citizen scientists who are eager to monitor, contribute to, and in some cases criticize scientific advances (Stodden, 2010). Review of scientific results from outside a research discipline can provide another check on the accuracy of results, but it also can introduce questions about the validity of findings that are not adequately grounded in knowledge of the research. Moreover, it can alter the relationship between researchers and the public in ways that require new levels of effort and sophistication among researchers involved in public outreach.

Advances in information technology are transforming the research enterprise, discipline by discipline, by changing the sorts of questions that can be addressed and the methods used to address them. There may be more opportunities to fabricate, falsify, or plagiarize, but there are also more tools to uncover such behavior.

- **The Globalization of Research**

Because knowledge passes freely across national borders, scientific research has always been an international endeavor. But this internationalization has intensified over the past two decades. Nations have realized that they cannot expect to benefit from the global research enterprise without national research systems that can absorb and build on that knowledge. As a result, they have incorporated science and technology into national plans and have established goals for increased R&D investments. They also have encouraged their own students and researchers to travel to other countries to study and work and have welcomed researchers from other countries. At the same time, private-sector companies have increased their R&D investments in other countries to take advantage of local talent, gain access to local markets, and in some cases lower their costs for labor and facilities. These and other trends, including cheaper transportation, better communications, and the spread of English as the worldwide language of science, are producing a new golden age of global science.

Once again, the trend is apparent in the author lists of scientific and engineering articles. Between 1988 and 2013, the percentage of science and engineering articles published worldwide with coauthors from more than one country increased from 8 percent to 19 percent (NSB, 2016). Also, some countries have dramatically increased their representation in the science and engineering literature. Between 1999 and 2013, the average number of science and engineering articles published by Chinese authors rose 18.9 percent annually, so that by 2013 China, with 18 percent of the total, was the world's second-largest national producer of science and engineering articles. Authors from China also increased their share of internationally coauthored articles from 5 percent to 13 percent between 2000 and 2010. Other countries that dramatically expanded their number of articles published included South Korea, India, Taiwan, Brazil, Turkey, Iran, Greece, Singapore, Portugal, Ireland, Thailand, Malaysia, Pakistan, and Tunisia, though some of these countries started from very low bases.

Another measure of the increasing internationalization of research is the number of foreign-born researchers studying and working in the United States. More than 193,000 foreign students were enrolled in U.S. graduate programs in science and engineering in 2013, and foreign-born U.S. science and engineering doctorate holders held 48 percent of postdoctoral positions in 2013 (NSB, 2016). Science and engineering doctorate holders employed in U.S. colleges and universities who were born outside the United States increased from 12 percent in 1973 to nearly 27 percent in 2013. The United States remains the destination for the largest number of foreign students at the graduate and undergraduate levels, though its share of foreign students worldwide declined from 25 percent in 2000 to 19 percent in 2013.

Internationalization offers many benefits to the research enterprise. It can speed the advance of knowledge and permit projects that could not be done by any one country working alone. It increases cooperation across borders and can contribute to a reduction in tensions between nations. It enhances the use of resources by reducing duplication of effort and by combining disparate skills and viewpoints. The experiences students and researchers gain by working in other countries are irreplaceable.

But globalization also can complicate efforts to ensure that researchers adhere to responsible research practices (Heitman and Petty, 2010). Education in the responsible conduct of research, while far from universal among U.S. science and engineering students, is nevertheless more extensive in the United States than in many other countries (Heitman et al., 2007). Codes of responsible conduct differ from country to country, despite efforts to forge greater international consensus on basic principles (ESF-ALLEA, 2011; IAC-IAP, 2012). In some countries with rapidly developing research systems, research misconduct and detrimental research practices appear to be more common than in countries with more established research systems (Altman and Broad, 2005). Students from different countries may have quite different expectations regarding such issues as conflicts of interest, the deference to be accorded instructors and mentors, the treatment of research subjects, the handling of data, and the standards for authorship. For example, one issue often noticed with foreign students in the United States is the different standards they apply to the use of ideas and phrases from others, which can lead to problems with plagiarism (Heitman and Litewka, 2011).

As the sizes of individual national research enterprises grow and become more competitive, institutions and sponsors can experience more problems with research misconduct. Differences in national policy frameworks may constitute barriers to cross-border collaboration, but efforts are being made to harmonize or at least make these frameworks interoperable. Collaboration among researchers from different countries and cultures may expose differences in training, expectations, and values that affect behavior.

Conclusions & future trends

As we conclude the report, we suggest actions for the research sector and its stakeholders, covering issues such as support for academics, change within academic culture and ways to drive impact.

There is a general desire for innovation within teaching and research output, but how does this match action? What are the consequences?

Our findings suggest that current research outputs such as the journal article are too long and difficult for students to use effectively for learning and that publishing and funding pressures are thought to be stalling innovation. Undergraduates, postgraduates and academics generally want change within higher education and believe that research could be made more accessible through greater use of technologies such as videos and animations and being more relevant to the real world.

Policy makers, funders, universities, academics, and publishers share responsibility for making research outputs fit for the future and it's time for all of us involved in the higher education landscape to consider what we can do to create change.

The danger of doing nothing is something we all need to respond to, especially at a time when the societal impacts of the pandemic are challenging the lives and futures of many. What is clear from the report findings is that we all need to work together to ensure the structures and incentives that currently dictate the research ecosystem do not hinder future academics from doing things differently in the future.

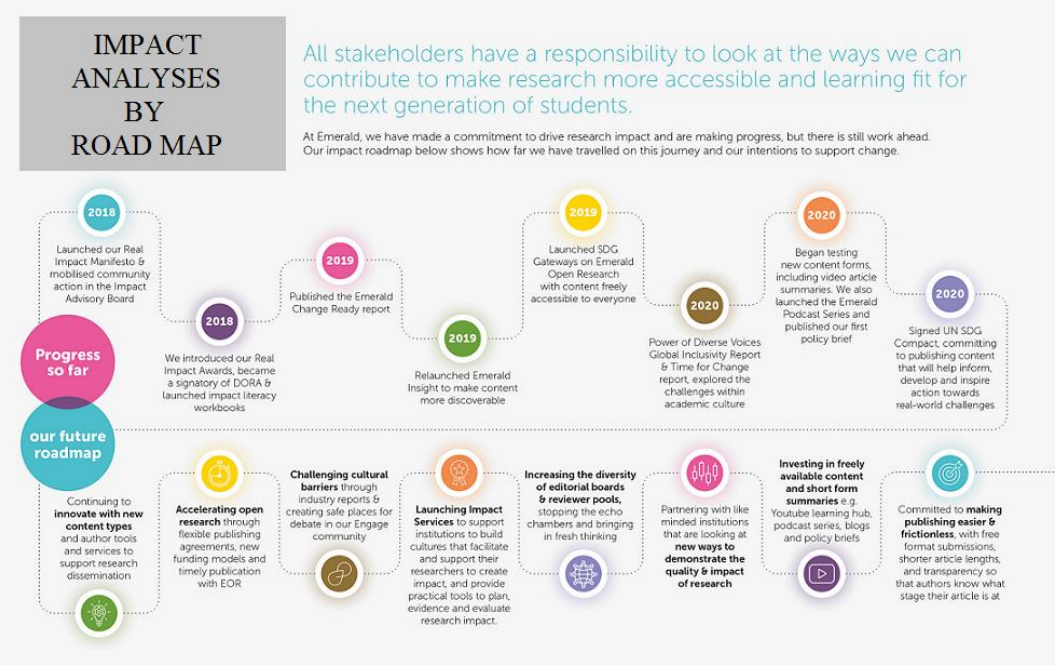
The report poses four key questions for the stakeholders of research-

1. What are the most effective resources we can provide for teaching and learning that address both students' and academics' preferences and needs?
2. How do we respond to the limits of the research article?
3. How do we reduce the barriers to innovation?
4. What does the future of research output look like?

In response, we suggest consideration is given to the points below:

- Many universities may be in precarious financial positions due to the COVID-19 crisis, however, where possible, they should create initiatives to help academics provide more varied teaching approaches, as well as craft more accessible and engaging research outputs.
- Academics are aware that current research outputs, particularly the traditional research paper, are difficult to understand and could be made more accessible to learners and presented more effectively to decision makers. They are however in a tough spot for initiating change (e.g. lack of budget, time, support). More research is needed into what specific support would help them alter their learning approaches and widen their research outputs.
- Universities and funders have a role to play in supporting new ways to communicate research and use broader measures to assess individual research contributions. They should move away from a focus on impact factors and citations as the key measures of success and the basis for incentives such as promotion, recognition and funding.

- Publishers need to lead from the front and recognise the role they must play in making research more accessible to the outside world. Signing up to DORA and promoting a broader range of impact metrics, moving away from journal impact factors and towards article-level metrics, will help drive change in academic culture.
- Publishers should explore how they can support change within research culture and publishing practices to help drive impact, looking at areas such as rapid and open dissemination, support to underfunded areas and greater focus on interdisciplinary research.
- For research to lead to impact it must be accessible to end users. Publishers can make research easier for students and non-academics to understand by providing supplementary content options such as videos, graphics, and images. They should look to provide support tools to help promote healthy research practice and support the exchange of knowledge with those outside academia, in forms that aid decision making and promote real world action.



REFERENCES

Altman, L., and W. J. Broad. 2005. Global trend: More science, more fraud. New York Times, December 20, pp. F1, F6.

Casadevall, A., and F. C. Fang. 2012. Reforming science: Methodological and cultural reforms. Infection and Immunity 80(3): 891-896.

ESF-ALLEA (European Science Foundation and All European Academies). 2011. The European Code of Conduct for Research Integrity.

Heitman, E., and S. Litewka. 2011. International perspectives on plagiarism and considerations for teaching international trainees. Urologic Oncology 29(1): 104-108.

Heitman, E., and J. Petty. 2010. Preparing students to navigate cross-national differences in the research environment: The role of research integrity education. Pp. 201-214 in International Research Collaborations: Much to Be Gained, Many Ways to Get in Trouble, M. S. Anderson and N. H. Steneck, eds. New York: Routledge.

IAC-IAP (InterAcademy Council and InterAcademy Panel). 2012. Responsible Conduct in the Global Research Enterprise: A Policy Report. Amsterdam: IAC-IAP.

Joppa, L. N., G. McInerny, R. Harper, L. Salido, K. Takeda, K. O'Hara, D. Gavaghan, and S. Emmott. 2013. Troubling trends in scientific software use. Science 340(6134): 814-815.

Nielsen, M. 2012. Reinventing Discovery: The New Era of Networked Science. Princeton, NJ: Princeton University Press.

NSB. 2016. Science and Engineering Indicators 2016. Arlington, VA: National Science Foundation.

Stodden, V. 2010. Open science: Policy implications for the evolving phenomenon of user-led scientific innovation. Journal of Science Communication 9(1): 1-8.

CORRESPONDING AUTHOR'S BIOGRAPHY

The **corresponding author, Dr. S R Chitra**, done her research work in Department of Physics at Anna University, Chennai, Tamil Nadu in India. She had published 20 research articles in scopus journals. Also she presented six conference papers about nanomaterials. She had published two national level books and six international level books.

jaicitra@yahoo.co.in linkedin.com/in/s-r-chitra-73

researchgate.net/s r chitra livedna.net/?dna=91.38229