

Awareness of Scientific Journals Amongst Students and Common Readers

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Abstract—Science is important for the development of the society. Society is constantly being updated with the knowledge of science and broadening its reach. Communicating science and finding large number of scientists to talk to the common people and students are still on a low profile. The eagerness and hunger for more news on science and technology update continues. To understand the importance of popularization of scientific discoveries amongst the students community has been surveyed by the researcher. In this paper an effort has been made to discuss the student's reaction towards communication of science by researchers, importance for communicating science and the need to present it in simple prose. The statistics, interest and willingness to learn from scientific discoveries is summarized in this paper.

Keywords- common readers, journals, research professionals, research publication scientists, research articles, science communication, science communicators, scientific discoveries.

1 INTRODUCTION

Recently, leading newspapers and news channels have flashed the news that Indian Union Minister of State for Planning, S&T and Earth Sciences has decided to triple the investment in the field of science from earlier Rs. 33000 crores to around Rs. 90,000 crores over the next five years and also double the expenditure of science section in R&D by roping in a private sector^{1, 2}. This move when approved will put India in the forefront and foster help in bringing out more number of technologies useful to man-kind. In other words, the aim of the Government of any country particularly India is that the fruits of scientific improvements should reach the common readers of their country. Huge grants are awarded to publicly funded research organizations (PFRO's) to work in the areas of food, water, energy, environment, etc. Scientist, researchers, domain experts work hard to generate a portfolio of research results, intellectual property and competitive technologies. To propagate their research they publish their research outcomes in the scientific journals which have an outreach in the highly intellectual scientific fraternity³. Such research outcome revolve round the scientific community unless and until it is publicized and takes the shape of a popular news article. There is always a gap between findings of research discoveries in magazines and developing the technology. The number of scientific discoveries outnumbers the popularity. The research publication is accessed by scholarly professionals and peers, but none are read by common people and students.

2 PROBLEM

Scientists, research scholars & research professionals who are associated with scientific research contribute solely to scholarly journals, so called the scientific research publications. The research contained in those journals is discussed by none other than the scientific researchers. The research work in these journals is depicted in a technical language understood by domain experts, authors, reviewers, research scholars, and other scientists. Presently, scientific research publications which contain scientific discoveries, findings, results, important information on processes, etc. do not exist for the widespread population and is limited to experts and scholars. Research Articles (RA) or Scientific Discoveries (SD) is a disclosure or revelation which is recorded individually by various authors in a journal. A survey was conducted amongst college students to find out if students are aware of journals and whether they read scientific discoveries.

3 METHODS / RESEARCH METHODOLOGY AND DESIGN

The main objective of the study is to find out the percentage of awareness of scientific journals and SD amongst college students. Different lists from various websites were taken and the list was compiled by cross checking to see that all the colleges are included and duplicate entries of college names were removed. From this compiled list, 10 % of the colleges were randomly selected for the survey. This 10 % constituted a total of 32 colleges that were considered as the main sample for the study. The study was conducted in the region of Pune, Maharashtra. A total of 320 samples were generated. From each of the 32 colleges 10 samples were taken. The respondents constitute multidisciplinary from

science, engineering and management and other non science colleges. In total 320 students from various colleges in Pune were interviewed to the study.

A well designed questionnaire was prepared keeping in mind that the college students may or may not have a science background. A pilot study was conducted to test the questionnaire and also the flow of information systematically. The samples were initially targeted to students above 12th standard. Each were given the scientific discovery and requested to give appropriate feedback. The feedback from the pilot study revealed that students from 12th plus belonging to first, second and third year bachelor's degree did not have enough exposure to understand the details of scientific processes involved in the scientific discovery. Therefore, post pilot study considers students from second and third year Master's degree course. The students from this group could give a good response and the investigation of the study was carried out successfully. The questionnaire used for the study was structured, non-disguised and consisted of 48 questions which were meticulously divided into three parts as presented in Table 1.

Table 1: ANALYSIS OF THE FIELD STUDY

Part A	i) The Standard Personal Details Part A was focused on personal information like name, science or non science background, class in which studying, subject of study, were they interested to read updates on science and whether they liked science.
Part B	Part B is focused on the following two categories of questions: ii) General Questions on the interest of students in science - represented in Table 2 iii) Questions on awareness of scholarly journals - represented in Table 3
Part C	Part C consists of handing over the SD / RA to students and giving them 20 minutes for reading it. Questions were based on the RA. Initially, the students read the RA and then answered the questions. At the end of the session, the researcher explained to the students regarding the RA in details by using simple prose. Once again the students were made to answer the same questions. This was done to find out the difference in pattern of understanding and thinking of the RA impact on the minds of the students. iv) Feedback Before and After Explaining to the students, the RA in simple prose - represented in table 4 v) Importance of Simplifying the RA - represented in table 5.

Source: Field Study Research

4 Analysis

Most of the students from scientific and non-scientific background were unaware of popular journals. They had only read science magazines like science reporter. Science based news from newspapers and televisions were read and heard by the students and common people. The internet was used by the students for finding out information related to their college projects and for

socializing, using emails, finding freewares, utilities, games and facebook. Goggle search engine was popularly used by the students and were not aware of goggle scholar. In Part A (i) 60 % student respondents have stated 'Yes' when asked if they like science even though they did not take up science for various reasons while 40 % did not like opting science for studies to built their career. However it has been revealed that such students read science updates regularly and would love to read more news on science updates. Tables 2, 3, 4 and 5 represents the results of responses on Part B (ii, iii) and Part C (iv, v) respectively.

TABLE 2: RESULTS OF RESPONSES OF THE FIELD STUDY (values in percentage)

Details	Yes	No	Don't Know / Not Heard of
Like to read science news, updates of science	80	20	0
Read and are Aware of Science Reporter Magazine	40	30	30
Motivated to Science	70	30	0
Access to Internet	100	0	0
Read Science Articles	95	5	0

Source: Field Study Research

Table 2: denotes values in percentage for the entire 320 samples taken. During the field study it was found that 80 % students have shown their interest to read science news and were regularly seeking updates of science and technology. The students were asked that if science was not covered would they miss reading science. For this the students explicitly disclosed that they would not feel like reading newspapers which do not contain science news. They also felt that the news is incomplete without science and technology. Though some of the students were from management and engineering background, these students responded that science is important and believe that S&T is advancing rapidly for which they do not want to be left out with any kind of advancement or information that carried news on S&T. The students further felt that the gadgets and internet access that they have is due to the privilege of using technology because of the advancement in science. One of the important reason behind this response, could be that, most of the students had good science teachers in their school days which has encouraged to have a question to students, 'did their science teachers motivate them?', 99% students said 'yes' and they are of the opinion that their science teacher was the best. The study reveals that India has advanced in reaching out to schools in bringing out new models of teaching and training to teachers and this may have resulted in good teaching practice at school level. Science Reporter is read by 40 % of the students and it was first introduced to them by their parents and friends. On the other hand 60 % students did not know and had not

heard of it in school days and to the extent till the date on which the study was conducted. The response regarding awareness of students regarding scholarly journals is presented in Table 3.

TABLE 3: AWARENESS OF STUDENTS REGARDING SCHOLARLY JOURNALS (values in percentage).

Details	Yes Would Like to	No	Not Interested / Not Heard of
Awareness of journals	20	50	30
Curious to Know what Scientist or Researchers do in the Lab	80	10	10
Like to Work in a Lab	60	40	0
Interested in Knowing How Research Is Conducted in a Lab	55	20	25
Thought of Inventing a Medicine on Your Own	26	70	4
Research Findings is Recorded in Journals	20	0	80
Need of Scientists / Researchers to Discuss Their Research	86	0	14
Scientists / Researchers Should Visit Colleges and Deliver Special Talks	89	0	11
Recollect Title of the RA	19	81	0

Source: Field Study Research

Table 3: mainly deals with the awareness of journals among the students. 10% students were aware of the journal called 'IJSC' (Indian Journal of Science Communication), 'Research journal of adsorption', and Journal on 'Green Chemistry', 5 % were aware of the journal, 'Nature' and remaining 5 % knew 'Environmental Science and Technology' journal, all of students have responded stating that their awareness came from their Professor / teacher. They said that they were briefed on RA contained in a journal. The remaining 80 % of students were curious and in fact showed their desire to accompany researchers in the laboratory. They also felt that it was the most interesting thing to do whereas students from management and IT felt that scientist know better what they do and it was best to avoid messing with them while remaining 10 % felt that they should not interfere as the experiment would be important and needed to be kept confidential. It was also disclosed by 60 % students that desired to work in labs if an opportunity was given to them, they would be excited to try out newer ways of experiment. The remaining 40 % are of the opinion that they should not leave the thought that all were aware of researchers performing in the lab in whatever stream they belonged to. Especially IT students felt that they could invent new software and try out new programs on their own in the lab though they would also like to work in a science lab if given a chance. According to the field study, 55 % students were interested to know how and what way a research is initiated. The respondents were of the opinion that the scientist have to unveil the puzzle of research that they felt was mind boggling, though, they had the basic idea that research has to find results for a problem or try to seek a solution. On the other hand field research it has been revealed that 26 % respondents were interested to

invent a medicine on their own and when asked what the medicine would be, they disclosed that medicines for cancer cure, breast cancer, HIV, stomach ache etc. are to be discovered and made available to the market in affordable low cost, while 70 % felt that they had not yet decided in this regard and 4 % skipped answering this question by keeping it blank.

When asked if they were aware of the fact that researchers record research findings in journals, only 20 % responded that are were aware of it while rest were not. Many of the students were not aware of recording the research findings nor were they aware of RA. When the researcher in Part C of the questionnaire explained the RA then most of the students felt that scientist and researchers should visit colleges and brief them on their research discoveries. The study revealed that explaining the RA created a sense of belongingness of the students towards the subject and they felt that it was extremely interested to know how and what research is carried out and the details of the recording in the RA. The students then felt that scientists / researchers visit their colleges and talk to them of their research. Before explaining the RA, only 19 % students could somewhat understand the information given in the RA and remember the title faintly while 81 % did not remember at all but could relate to somewhat information from the paper though they felt that the paper was difficult to understand and went bouncers. The feedback before and after explaining the RA to students is given in table 4.

TABLE 4: FEEDBACK BEFORE AND AFTER THE EXPLANATION (values in percentage).

Details	After RA was Given but Not Explained (ARAGN)		After RA was Given and Explained (ARAGE)	
	No Idea	Understood	Understood Well	Could Relate
Comments from Students				
Science Communicators Should Interact with Students and Common People Through RA and otherwise	95	No	Yes	100
Aware of Courses for Training in Science Communication	0	0	100	100
I am not Science Student But I Love to Read and Get Updates on Science Topics	100	100	100	100
Understand the RA	14 (somewhat)	66	0	100

Source: Field Study Research

The above table 4: records the percentage of student's response after RA was given and not explained (ARAGN) and after RA was given and explained (ARAGE). The students have less than fairly understood the RA before explanation and student's response was excellent after the RA was explained to the students. ARAGN students were not aware of science communicators and so did not have any idea if science communicators should interact with

students and common people but when the RA was explained to them by the researcher, the students understood the role of science communicators (SC) and few of them felt that instead of scientists explaining their research to SC's the scientists themselves could visit colleges or speak to media about their research. As they are experts in their field some students felt that the scientists and the researchers were too busy carrying out their research work.

ARAGN students were not aware of the trained SCs ARAGE. They felt that SCs should be well trained and they could take charge in place of busy scientists to explain their research. ARAGE the students felt that an exclusive newsletter or a supplement should be exclusively brought out for college students containing the research updates. The study revealed that all the students irrespective of their specialized area i.e. even non science background students and people were eager to hear and read science news and they felt scientific discoveries was extremely interesting. At the end of the survey, all the students who have been interviewed could understand the RA well. During the field research the respondents were asked about the importance of simplifying the RA. The analysis has been shown in table 5.

TABLE 5: IMPORTANCE OF SIMPLIFYING THE RA (values in percentage)

Details	Not Important	So Important	Very Important	Highly Important
Language of the RA should be Simple	9	20	36	35
RA should be understandable to Students	0	30	40	30
RA should be introduced to Students	5	0	47	48
RA is important and knowledgeable	0	25	32	43
Abstract is Important part of the RA	0	10	40	50

Source: Field Study Research

Table 5: contains percentage of answers to find out the language of RA. Most of the students who were interested in gathering knowledge from the RA showed interest in reading the RA, whereas few have lost interest by the time they finished reading the abstract. The rest of the students took more than 30 minutes to read the complete RA. The study reveals that because the student felt the paper is difficult to read due to its technical nature the students found it difficult to connect most of the abstract with the results, figures and conclusions. Further it has been revealed that students were more comfortable in reading the conclusion and some part of the introduction of the RA. It has also been found that 9 % students felt that the RA was not important because they could not link the paper and connect its story. On the other hand these 9% students have felt that if the RA was simple to read, they would have understood it well. Further 20 % of the students have felt that it was important for RA to be written in simple language, while 36 % have felt very important that RA

should be written in simple language. This was revealed after the researcher explained the background, objectives, and outcome of the RA, then only the students could also be able to understand the RA and felt that the RA was extremely important and would like to read and keep themselves updated on the research activities which scientist perform during their research. The remaining 35 % are of the opinion that the RA should be simple and this should be considered highly important by the research fraternity.

In addition, 30 % students felt that significantly RA should be understandable in a language which students can understand, while 40 % felt that it is very important and remaining 30 felt it was highly important that the RA be written in a simple language. Students responded well to the question that RA should be introduced to their students at the Post graduation second and third level students. 5 % from arts students have felt that it was not important whereas 47 % and 48 % felt it very important and highly important respectively. None of the respondent students have revealed that RA is not important or not knowledgeable. 25 % respondents have stated that RA is important and knowledgeable whereas 32 % and 43 % respondents have stated that it was very important and knowledgeable and highly important and knowledgeable respectively. Cent per cent respondents have stated that abstract is an important part of the RA. Out of 100%, 10 % are of the opinion that abstract is important whereas 40 % have felt that abstract is very important part of the RA and remaining 50 % have felt that abstract is highly important part of RA.

5 FINDINGS

During the field study it was found that 99.9 % of the students saw the RA for the first time. The students had not imagined that scientists can record findings meticulously. The students also felt that the RA has an interesting story of a discovery that is uncovered to form a technology relevant to the common people. The study disclosed that RA is summarized in an abstract form which is a small part of the complete 7-8 pages of an RA.

If publishers and science experts could accommodate in their present format, an 'abstract for common readers' ACR, (could benefit students also) by rewriting the present abstract contents in an easy way to understand prose, then it would bring in a whole new revolution of extending the scientific discoveries in simple prose to the students and common people. The newly included 'ACR' may be incorporated only to those scientific discoveries that have a direct application to the common people. For example, SD's

or RA's that contain application results for living organisms (eg. human, plants or animal needs) like water, energy, fuel, agriculture, nano technology, medicine, etc.

The popularity of scientific discoveries would increase and give a boost to young generation thereby creating a scientific temper and recognizing the efforts that follow an invention. The study revealed that college students are hungry to read more science news and for this, a separate newsletter should be developed and subscribed to all colleges exclusively for students reading.

A journal exclusively for students should be developed for offering students to publish their work. Even though the study conducted does not cover entire students from the science stream, all students were interested in scientific updates. The student respondents felt that scientists should be invited to visit colleges to brief the students and motivate them towards scientific research. The study has further revealed that more number of science communicators should be available so that correct and reliable communication of science could take place that may result in enhancing the reach of science to a broader spectrum and not limit it only within the scientific fraternity.

6 CONCLUSION

Student community is hungry for more science news. Not all discoveries, inventions, applications useful to common people are made available to them. The total SD's recorded, outnumber the popularity of SD's. There is a gap in recording the research results and its popularity. In popularizing the SD, the researcher too will get recognition. This will give a boost to develop more number of technologies for common people. There may be a spurt increase in drugs technologies that may reduce the cost of drugs and increase market demand because it may be affordable to common people. The increase in number of technologies for social cause will no doubt result in economic upgradation of the country.

7 ACKNOWLEDGEMENT

The author thanks Principals, Head of Department of all the colleges in Pune who have given permission to conduct the survey amongst students.

8 REFERENCE

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