



STUDY ON CHANGES IN DISASTER MANAGEMENT EDUCATION IN JAPAN: ANALYSIS OF THE DISASTER MANAGEMENT EDUCATION CHALLENGE PLAN

Kouji SATO⁽¹⁾, Reo KIMURA⁽²⁾

⁽¹⁾ Chief teacher, Utatsu Junior High School, Minami-sanriku Town, Miyagi Prefecture, utatsu-jh@key.ocn.ne.jp

⁽²⁾ Professor, School of Human Science and Environment, University of Hyogo, Himeji, Japan, rkimura@shse.u-hyogo.ac.jp

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Abstract

This study provides analysis of actual cases of the Disaster Management Education Challenge Plan (“DECP”), in which voluntary disaster management specialists support disaster management education in schools and communities. The Cabinet Office of Japan, in collaboration with the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and the Ministry of Education, Culture, Sports, Science and Technology (MEXT), has supported the Disaster Management Education Challenge Plan Steering Committee, which consists of voluntary disaster management specialists. From fiscal year (FY) 2004 to 2018 (April 2004 to March 2019), 307 individual programs were conducted under DECP.

To identify changes in disaster management education programs before and after the Great East Japan Earthquake (“the Earthquake”), this study classified individual education programs conducted under DECP into two groups, by phase (before and after the Earthquake), and compared the two groups from the following perspectives: the type of organization that conducted the education program, target learners, target disaster type, and style of learning. The data used in the analysis were provided by the DECP secretariat. The data collected through FY 2013 contained multiple-answer questions, but these were changed to single-answer questions in FY 2014. For such multiple-answer questions, in our analysis, the score was divided proportionately and allocated to the answers according to the number of times each answer was selected in each year.

The analysis provided some characteristic results: first, for the target disaster type (Fig. 1), after 2011, the year of the Earthquake, the number of programs targeting earthquake and tsunami increased to some degree. Subsequently, the number of programs targeted at multiple hazards, which addressed diverse disaster types without focusing on a single type, increased. This is due to the fact that many disasters related to heavy rainfall have occurred across Japan since the Earthquake.

Second, the majority of organizations who apply for the DECP are elementary, junior high, and high schools, which are “schools” defined under Article 1 of the School Education Act of Japan. This trend remained consistent before and after the Earthquake. Our equivalence test, based on a Chi-squared test of the different types of organizer schools, revealed no significant differences that reject the null hypothesis before vs. after the Earthquake. A statistically significant increase was observed in the number of programs targeting college students and working people, whereas a significant decrease was observed in the number of programs targeting teachers, parents, and groups combining these two populations.

In regard to the style of education, differences before vs. after the Earthquake were evaluated using the difference between the two population proportions, based on the Chi-squared test; the results revealed significant increases in the number of programs performed as interdisciplinary classes at school, school excursions, and emergency drills. Meanwhile, a significant decrease was observed in the number of programs performed as disciplinary classes at school, or as lectures, both of which tend to be provided in a format in which the students sit and learn.

A similar test of the purpose of these programs revealed a significant increase in the number of programs with the goal of conducting emergency drills and a significant decrease in the number of programs with the goal of conferring knowledge and skills related to and/or enhancing awareness of disaster management.

Keywords: Disaster education; educational program; Disaster Management Education Challenge Plan



1. INTRODUCTION

Japan is one of the countries most affected by natural disasters. After the Great East Japan Earthquake (“the Earthquake”) in 2011, the average number of people dead or missing due to natural disasters in Japan rose to about 190, as shown in Fig. 1.

Recent major earthquake disasters in Japan include the 2016 Kumamoto Earthquake, the 2018 Northern Osaka Prefecture Earthquake, and the 2018 Hokkaido Eastern Ibari Earthquake.

In 2014, Mount Ontake erupted. In addition, disasters caused by rainstorms or torrential downpours include the 2014 Hiroshima Landslides, the 2016 Typhoon No. 10 that hit Hokkaido and Iwate Prefectures, the 2018 Western Japan Heavy Rain, and the 2019 Typhoons No. 15 and 19, which caused wide-ranging flooding by inland and coastal water.

These natural disasters occur throughout the country. Therefore, it is necessary to give appropriate disaster management education to citizens from a young age, appropriate to their level of understanding. Today, in Japan, disaster management education (e.g., evacuation drills) is regularly performed in various schools including kindergartens; elementary, junior high, and high schools; and universities. In addition to such regular educational opportunities in schools, various organizations such as voluntary disaster mitigation entities organized for each community, non-profit organizations (NPOs), private companies, and local governments (prefectural and municipal) provide their own disaster management education for every layer of citizens in this country, in a multitiered manner. However, the relationships among these efforts have not been systematically organized. In addition, improvements in the quality of implementation of these educational efforts are largely dependent on individual entities and practitioners. It is also notable that currently, only the elderly, housewives, and children participate in disaster response drills because the disaster management program only repeats identical drills; consequently, these efforts cannot be seen as effective measures for disaster management because they do not involve all local residents. In this context, to address the desired disaster management education in the future, this study attempted to identify the trends in disaster management education in Japan by comparing the contents of all implemented programs of the Disaster Management Education Challenge Plan (“DECP” or “the Plan”)^[1] before and after 2011, when the Earthquake occurred. DECP is a nationwide disaster management education initiative that is implemented by groups of voluntary disaster management specialists and lead by the Cabinet Office of Japan, in collaboration with the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the Ministry of Land, Infrastructure, Transport and Tourism. Figure 2 shows the trends in the numbers of programs conducted by organizations under DECP, by target disaster type.

DECP was implemented with the purpose of facilitating widespread dissemination of disaster management education across Japan. The Plan invites proposals for disaster management education programs from all over Japan. Each year, about 15 successful programs (and hence 15 successful organizations) are selected by the Plan's Executive Committee, which consists of voluntary disaster management specialists.

The successful organizations (“implementing organizations”) range from educational institutions such as schools and universities, to local public authorities, self-governing bodies, NPOs, and private companies. These organizations will implement disaster management education for 1 year while receiving financial support and advice from the Executive Committee. The outcomes and efforts of the implemented education

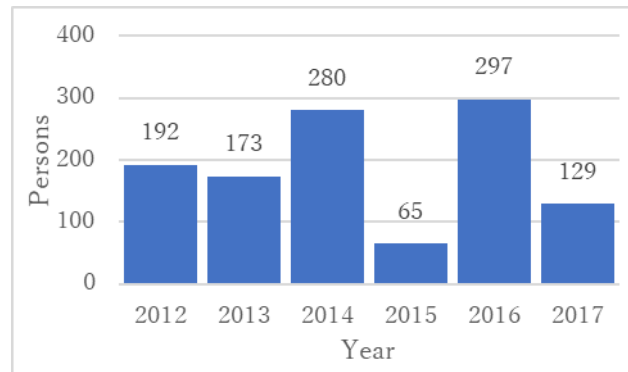


Fig. 1 The number of dead or missing people due to natural disasters
(created by the author based on the White Paper on Fire Service each year)

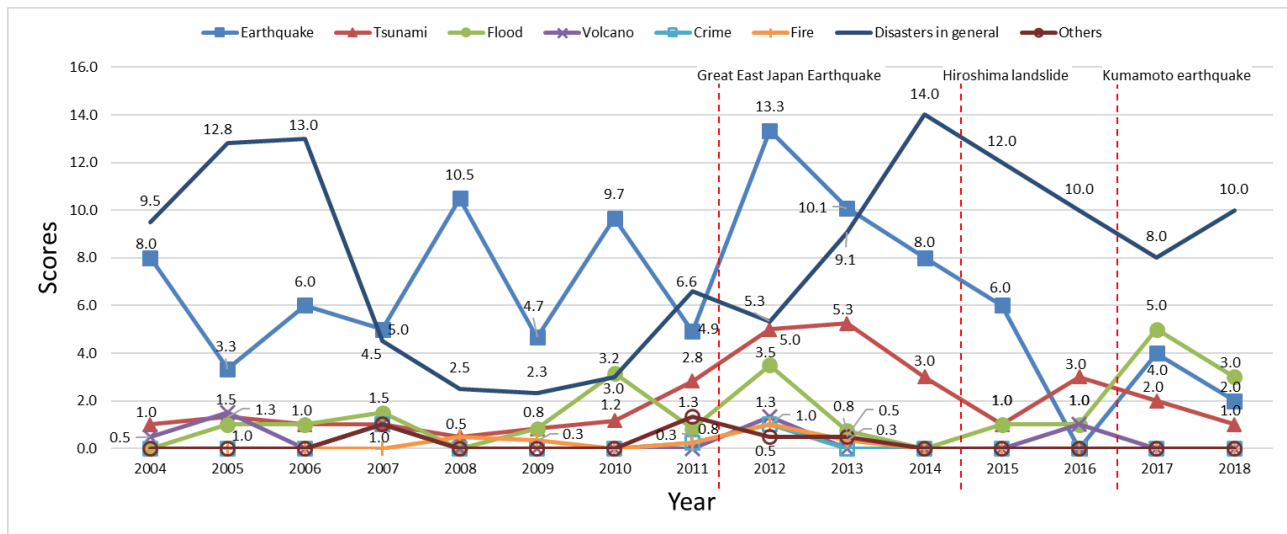


Fig. 2 Trends in the numbers of programs conducted, by target disaster type (based on scores calculated in this study)

plans will be presented in an activity report meeting. Implementing organizations with remarkable achievements are recognized by awards each year.

In addition to what was described above, DECP also carries out the following activities: first, accumulating valuable lessons learned from past implementing organizations and publishing them as case reports on the Internet; and second, encouraging information exchange and interaction between each implementing organization. Through these ongoing efforts, each implementing organization actively collects useful information from case reports and other implementing organizations and utilizes it to improve and enhance its own efforts. The Executive Committee also actively encourages implementing organizations to imitate the best practices of other organizations because this leads to the dissemination of good practices nationwide and the improvement of disaster management education in Japan.

Other projects that recognize excellent disaster management education efforts on a nationwide scale include the *Bosai Koshien* [2] and the Community Safety Map Contest [3]. Although these two initiatives mainly target school-aged children, DECP does not restrict ages of learners.

As a general rule, the Plan invites proposals without any restrictions on the proposed program contents; consequently, past implementing organizations included one based in the United States. Considering these unrestricted characteristics of the Plan, it would be best to analyze programs implemented in the past under the Plan to understand the general trends in disaster management education in Japan.

2. METHODS

This study analyzed data from 283 disaster management education programs implemented under DECP in 15 years from fiscal year (FY) 2004 to FY 2018. The dataset was provided by the Plan's Executive Committee.

The dataset for the 283 implementing organizations included variables such as type of organization (school, local organization, NPO, etc.), target learners (elementary school children, local residents, etc.), target disaster type (earthquake, flood, etc.), style of learning (experiential learning, lectures, etc.), and the purpose of the education (raising awareness against disaster management, etc.). We classified the dataset into two groups by phase, before and after 2011, in which the Earthquake occurred, and analyzed them with these variables to identify the changes in disaster management education programs before and after the Earthquake. We also analyzed the impact of the Earthquake on disaster management education and discuss features of an ideal disaster management education program.



The data collected through FY 2013 contained multiple-answer questions, but these were changed to single-answer questions in FY 2014. In our analysis, the score allocated to multiple-answer questions was divided proportionately and allocated according to the number of times each answer was selected in each year.

3. Overviews of implementing organizations of DECP before and after the Earthquake

In 2004, DEPC started to host only single year programs. We divided the 15-year term from FY 2004 to FY 2018 into two periods: 1) 8 years from FY 2004 to FY 2011 (before the Earthquake); and 2) 7 years from FY 2012 to FY 2018 (after the Earthquake). We compared the aforementioned variables between these two terms. The numbers of implementing organizations before and after the Earthquake were 132 and 151, respectively.

From FY 2004 to FY 2018, DECP's data collection method was changed once; accordingly, in this study, the data comparison was made by giving 1 point to each variable for each implementing organization.

1) Regional distribution of implementing organizations

Figure 3 shows the regions where the implementing organizations are based; they are evenly distributed throughout the country. After the Earthquake, the proportion in the Kanto, Chugoku, Shikoku, and Kyushu regions increased, likely due to the increased fear about the next massive earthquake in the Tokyo area, increases in storm and flood damage, and the significant damage from the 2016 Kumamoto Earthquake.

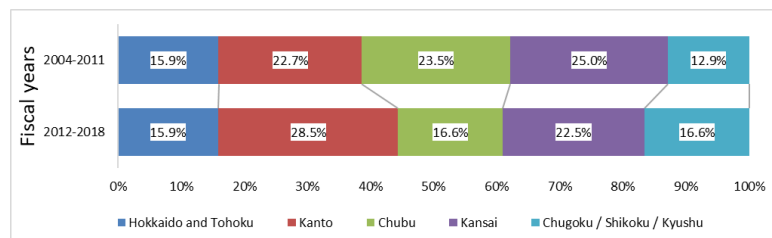


Fig. 3 Regional distribution of implementing organizations

2) Types of implementing organizations

As shown in Fig. 4, the majority of the implementing organizations are schools. After the Earthquake, the proportion of programs implemented at schools or communities increased. On the other hand, the proportion of programs implemented by volunteers or academic entities has decreased.

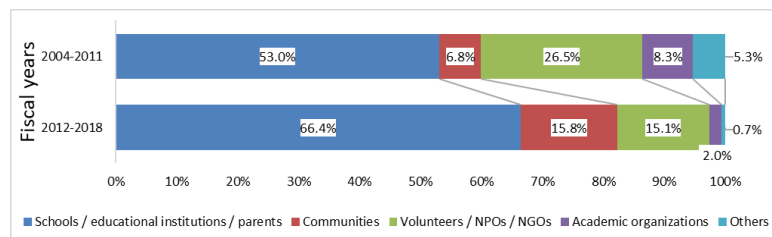


Fig. 4 Proportion of Implementing organizations

3) Target learners

As shown in Fig. 5, about 60% of target learners were students in educational institutions (kindergartens, nursery schools, elementary schools, junior high schools, high schools, and universities). An equivalence test on school type did not identify any significant difference before and after the Earthquake ($\chi^2_{(5)}=6.928$, n.s.). In addition, differences before and after the Earthquake were examined using the difference between the two population proportions; the results revealed significant increases in the proportion of programs targeting high school students ($\chi^2_{(1)}=6.492$, $p<.05$), university students ($\chi^2_{(1)}=16.335$, $p<.05$), working people and adults ($\chi^2_{(1)}=27.116$, $p<.05$), and all people ($\chi^2_{(1)}=25.671$, $p<.05$). The proportion of educational efforts targeting adults, such as university students and working people, tended to be higher than the proportion of programs targeting children. Based on this result, disaster management education seems to be undergoing a transformation toward targeting all people, rather than specific groups.

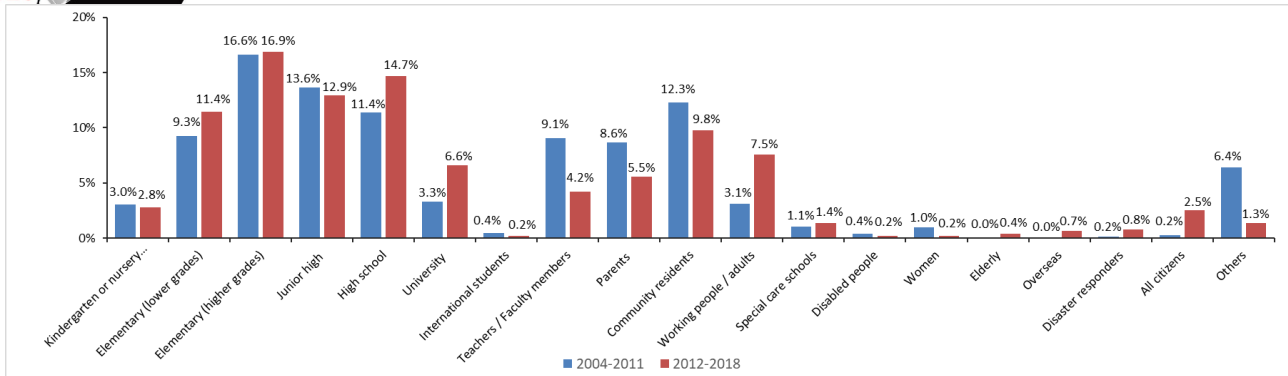


Fig. 5 Target learners

4) Target disaster types

As shown in Fig. 6, the most targeted disaster type was "disasters in general," whereas earthquake was the most targeted specific disaster. After the Earthquake, the proportion of programs that cover disasters in general increased from 41.1% to 45.0%. This may indicate that attention to disaster management increased after the Earthquake, and that efforts have been made throughout Japan to prepare for future disasters, taking region-specific hazards and characteristics into account. This could also be because disasters related to large and intense storms occurred frequently in the years after the Earthquake. In light of this situation, the number of multi-hazard efforts has increased.

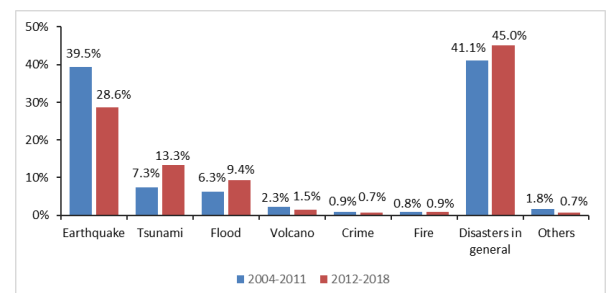


Fig. 6 Target disaster types

5) Style of learning

Differences in style of learning before and after the Earthquake were tested. As shown in Fig. 7, the results revealed significant increases in the proportion of programs performed as interdisciplinary classes at school ($\chi^2_{(1)}=12.976$, $p<.05$), school excursions ($\chi^2_{(1)}=41.299$, $p<.05$), and evacuation drills ($\chi^2_{(1)}=31.335$, $p<.05$). However, we found a statistically significant decrease in the proportion of lecture-based programs; e.g., classroom

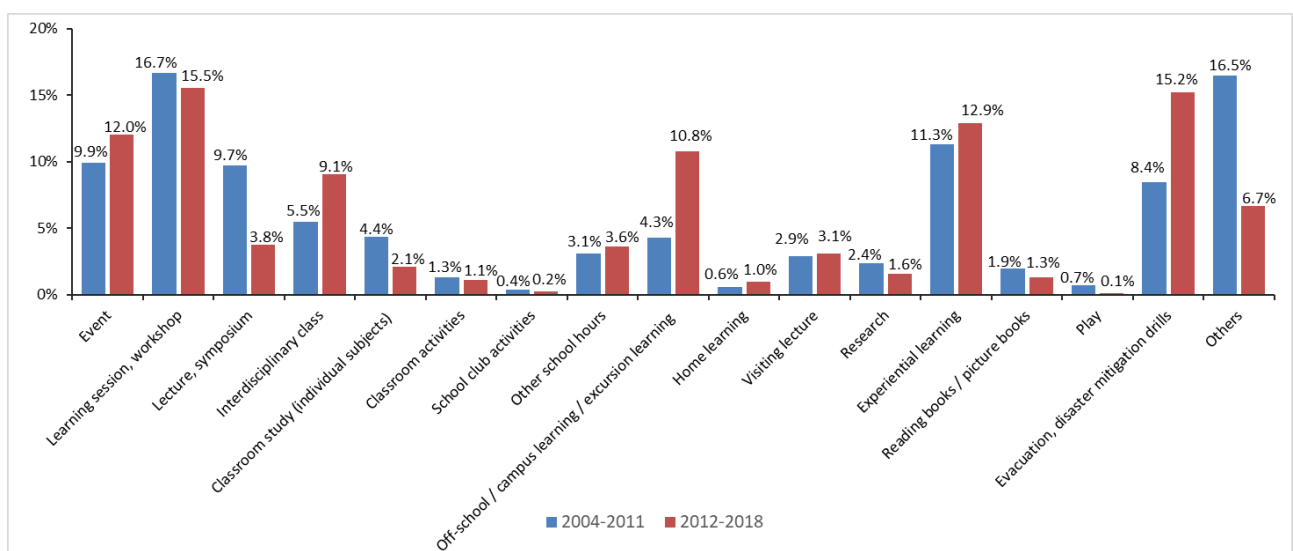


Fig. 7 Style of learning

study (individual subjects) ($\chi^2_{(1)}=12.033$, $p<.05$) and lectures ($\chi^2_{(1)}=41.798$, $p<.05$).



4. DISCUSSION

We divided the 15 years of DECP into two phases, before and after the Earthquake, for the purpose of analysis. The results of our analysis can be summarized as follows.

Disaster management education is widely implemented throughout Japan. Consequently, attention to disaster management education has increased after the Earthquake; moreover, because a great deal of damage is caused by large and intense storms and floods almost every year, the proportion of multi-hazard education programs, not limited to earthquakes or tsunamis, is increasing. In addition, although about 60% of implementing organizations covered in this study are schools and other educational institutions, the proportion of educational programs targeting working people or all local residents has increased after the Earthquake. Furthermore, with regard to the style of learning, we observed an increased proportion of experiential learning, such as evacuation drills and off-campus learning, and a statistically significant decrease in the proportion of lecture-based learning and classroom study.

Our results indicate that disaster management education in Japan is being conducted mainly by schools and educational institutions, but an increased interest in disaster management after the Earthquake has led to the spread of disaster management education into local communities, including working people. The increased interest in disaster management may be due to the frequent occurrence of disasters and media coverage regarding damages in Japan, as well as the enriched content and increased frequency of media reports on disaster management efforts after the Earthquake. In any case, it is clear that various attempts have been made to improve the content of disaster management education programs in each region and at each layer of society for the purpose of improving disaster management education throughout society. Because the content of disaster management education is enriched, and various approaches to disaster management education have been developed, we anticipate that disaster management education in each region will be a continuous process, and that each region will have the capability to respond to multiple hazards unique to its local characteristics. We also expect that these kinds of educational efforts will naturally be passed on to the next generation in each region.

In addition, we would like to highlight that disaster management education initiatives at Japanese schools are shifting from classroom study and lectures to experiential learning, such as evacuation drills and off-school/campus learning. In fact, in recent years, few DECP programs have focused on classroom study or lectures alone. Instead, an increasing number of programs have provided students with opportunities to learn experientially. Many recent DECP programs have provided students with opportunities to understand actual evacuation routes and methods and to visit the unique sites in their communities, such as geoparks. These opportunities enable students to learn about these community-specific sites and interact with the local people.

In school disaster management education, as described in the Reference Materials for Disaster Management at School – Development of Disaster Management Education to Foster “Zest for Life”^[4] issued by MEXT, emphasis is placed on the development of “zest for life.” As shown in Fig. 8, the development of “zest for life” includes two types of disaster management

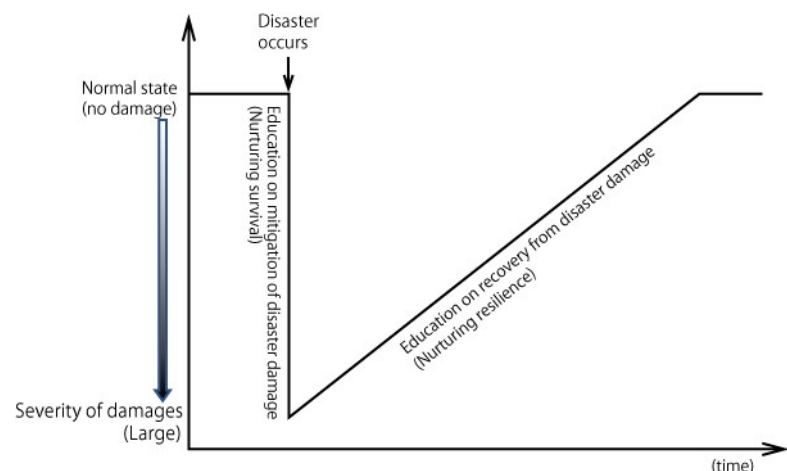


Fig. 8 Two objectives of disaster management education at schools (conceptual figure, created by the author)



education: 1) education that cultivates the ability to survive in case of disaster, i.e., emergency responses, and 2) education that nurtures students' resilience, i.e., recovery from disaster (e.g. life at evacuation sites and recovery works in collaboration with local residents). For example, evacuation drills aim to foster the former capability (capability to survive), whereas off-campus/school learning and training in methods for compassionately helping one another at evacuation sites foster the latter capability (resilience).

The major theme of the Course of Study Guidelines issued by MEXT ^[5] is to nurture in students "Zest for life" through school education. In order for disaster management education to be widely practiced in schools nationwide, it is necessary to enhance educational activities aimed at fostering the latter capability, resilience. The results of this study are considered to represent these trends.

5. Acknowledgements

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