

ARTEC2023 Lecture Diary

(October 11, 2023; October 18, 2023)

1 Multiple Intelligences

- Multiple intelligences is a concept advocated by Howard Earl Gardner, a professor at the Harvard School of Education, in his book *Frames of Mind: The Theory of Multiple Intelligences* in 1983.
- One idea in multiple intelligences is that intelligence of a human should not be valued solely by his/her academic result. Even if a human performs poorly at school, the human may perform very good in sports, music and arts. In this regard, a human with good performance in the discipline other than academic should also be claimed as intelligent.
- However, in 1980s and 1990s Hong Kong, many parents misinterpreted the ideas behind multiple intelligences. They confused that each human should have multiple intelligences. Thus, many parents arranged a number of extra-curriculum courses for their children. Those courses included swimming class, piano class and drawing class. In the end, many children did not spend much time in academic learning and performed poorly in school.

2 Follow-Up of Borges *et al* Paper

- The paper was distributed in October 4, 2023 lecture.
Borges, A. F., Laurindo, F. J., Spínola, M. M., Gonçalves, R. F., & Mattos, C. A. (2021). The strategic use of artificial intelligence in the digital era: Systematic literature review and future research directions. *International Journal of Information Management*, 57, 102225.
- From Google Scholar, a recent paper authored by Laurindo has been found.
Borges, A. D. F. S., Azevedo, C. D. S., Laurindo, F. J. B., & Spinola, M. D. M. The Role of Data Science and Ai for Predicting the Decline of Professionals in the Recruitment Process: Augmenting Decision-Making in Human Resources Management. Available at SSRN 4502475.
- In the abstract, the authors mentioned the following.

The scenario constituted by the emergence of fast-paced new technologies has been influencing the significant increase in the number of job opportunities in the Information Technology (IT) sector in recent years. Within this context, there are many challenges involved in the process of recruitment and selection for IT professionals, which are mainly regarded to the high decline rate of skilled workers.

The evidence for *high decline rate of skilled workers* is from a Gartner report released in 2022, entitled 'Top 5 priorities for HR leaders in, 2023: Actionable and objective advice to tackle top HR challenges'. However, this report is no more available. The latest report is entitled 'Top 5 priorities for HR leaders in, 2024: Actionable and objective advice to tackle top HR challenges' and it had been distributed in the lecture. However, the report has not mentioned anything about the *high decline rate of skilled workers*. It is a bit odd to me.

- The Gartner report highlights one findings. More than fifty percent employees feels that their managers might not be able to lead them within two years. Even though, HR departments provide training programs for the managers to learn new tools and technologies. In the lecture, I mentioned that AI tools should be some of them.
- In the lecture, I have mentioned my guess on the above finding. One reason could be due to the age problem. The age of manager is usually ranged from 30 to 50. The learning ability of this age group usually declines and thus the managers might not be able to learn new skills. The second reason could be due to the multitasking behavior of the managers. It has been researched that multitasking could reduce the efficient and learning ability of a person. In this regard, a manager with many tasks to complete is hardly to learn new skill.
- Gartner in 2003 introduced a model called *hype cycle*. *Gartner Hype Cycles provide a graphic representation of the maturity and adoption of technologies and applications, and how they are potentially relevant to solving real business problems and exploiting new opportunities. Gartner Hype Cycle methodology gives you a view of how a technology or application will evolve over time.*¹
- In the last two decades, the hype cycle model has been applied to present *the change of the expectation of the business value of Internet and web technology* to the industry over time. Recently, it has been applied to present the *expectation of the business value of AI* to the industry over time. Thus, the model reveals the change of the number of startup firms and the amount of investment in the *Internet and web technology* (resp. AI) industry over time.
- Gartner (www.gartner.com) is multinational corporation (MNC) focusing on market research. Gartner releases many research reports a year. Similar to Gartner, International Data Corporation (IDC) (www.idc.com) is also a MNC focusing on market research and releasing many reports each year. Not mentioned in the lecture, Forrester Research (www.forrester.com) is yet another market research firm. Some accounting firms, like PricewaterhouseCooper (PWC) (www.pwc.com) and Deloitte (www.deloitte.com), have conducted market researches and released reports.
- The data revealed in those reports have always been quoted by startup firms as proofs of future revenues in their business proposals (resp. business plan) for seeking investments from venture capitalists.
- Discussion of the questions in Assignment 2 regarding the Borges *et al* paper is postponed to October 18, 2023.

3 Yahoo!

- Before 1993, Internet domain name registration and management were administrated by an US government agency. In that period of time, an university normally could successfully apply for a domain name. For the domain name with `.com`, only US giant tech firms, like `ibm.com` and `hp.com`, were able to get. In 1993, US government decided to release the domain name administration to the public.
- After that, many commercial firms and individuals started to apply for domain names. Many startup firms were thus founded. Some of them, like Netscape and Yahoo, provided free tech services online. Some of them, like Amazon and eBay, provided platforms for their people to buy and sell products online.
- To succeed the development of such platforms, two important technologies have to be mentioned – the hypertext transfer protocol (HTTP) and the browser. The HTTP allows a person to code a webpage (in HTML format) for a browser to render the webpage and display it on the browser window.

¹<https://www.gartner.com/en/research/methodologies/gartner-hype-cycle>.

- In 1994, the core service of Yahoo was its search and directory services. Yahoo server was able to crawl a lot of hyperlinks over the Internet and then categorized the natures of the hyperlinks crawled. The hyperlinks were then put them under the directory listed on the home page.
- In 1997, Yahoo provided *Yahoo! Mail* service, a free of charge email service. In that period of time, there were many searching engines available. But not every search engine provided email service for the users. No doubt, the free-of-charge email service attracted a lot of users providing their personal information for getting email accounts. As a result, many users spent time in checking and replying emails everyday. Together with the search and directory services, Yahoo was able to make money from its advertising service. It included the pop-up advertisements, email marketing and database marketing for merchants.
- Clearly, many *Yahoo! Mail* users felt annoying in those advertisement emails. Hence, it triggered the later development of spam filters for email servers.
- Before 1993, there was a system called *Gopher*. It was a text-based platform consolidating many forums. You can imagine that *Gopher* looks like PTT in Taiwan. Many science and engineering departments in the world had their *Gopher* pages. The contents put on a *Gopher* page were essentially the same as the contents put on a department homepage today. In a departmental *Gopher* page, there was usually a link called *Technical Reports*. The page listed all the master thesis, doctoral dissertation, papers in submissions, unpublished manuscripts and working papers from the department and provided information for FTP downloading such reports.
- Owing to let the public to download a technical report, many departments had set up an *FTP server*. The account name for the public is called **anonymous**. Its password is empty.
- With *Gopher* and the *FTP server*, we were able to search and download the latest research reports for our researches. It is clear that the process is time consuming. With *Yahoo! Search*, the time spent on searching and downloading reports was reduced. However, I still had to spend time to visit each of the department homepage for the technical reports relevant to my research, simply because *Yahoo! Search* was not so powerful.
- In the early 1990s, web portal had not been introduced both in the academic and the industry. Until in the late 1990s, a lot of Internet users had daily accessed of Yahoo! for the email service, news browsing and information searching. At the same period of time, many platforms provided services for merchants to build online shops, for enterprises to manage their procurements and supply chains management. Those platforms, including *Yahoo!*, were coined as web hosting platforms or web portals.
- A platform providing services for procurement management, supply chain management and customer relationship management was also called an *application service provider* (ASP). The nature of an ASP is basically the same but simpler as a cloud platform today.

4 Survey Paper

- A survey paper is importance for any research. Only if a survey is comprehensive, potential (and valuable) research problems for a doctoral research can be laid. A survey paper could be submitted for publication.
- There are many different types of survey papers. The paper authored by Borges *et al* is an example. The authors organized the relevant research works on the *strategic use of AI* and presented a framework embracing the works. From the framework, the authors identified potential future researches, in forms of propositions, for the researchers.
- Another type of survey papers adds quantitative analysis on the number of publications alone the line of research, called *bibliometric analysis*, like the paper below.

Da Costa, R. P., Almeida, C. F. M., Udaeta, M. E. M., Municio, A. L., Nascimento, V. T., & Laurindo, F. J. B. (2022, October). Energy Commercialization Proposition into a P2P Framework in Micro-grids for Brazilian Energy Communities. In *2022 IEEE International Conference on Power Systems and Electrical Technology (PSET)* (pp. 280-289). IEEE.

5 Research Proposal

Once a **comprehensive survey** on a topic has been completed, potential research problems will be identified. Their problem statements are stated precisely. Then, **preliminary investigation** of each problem will have to be conducted. After that, a research proposal could be compiled.

- For instance, to find out *a conceptual model for the critical factors governing the purchasing intention of a home video game console*, one might need to interview a few video game players for the factors. *Interview is the preliminary investigation*. Usually, the factors revealed from the players might be deviated from the factors surveyed in the survey paper. In this regard, the researcher will have to re-analyze which factors should be included in the conceptual model. In the end, **the conceptual model to be validated** can be defined and the research method for validating the conceptual model is designed.
- Sometimes, some logical consequences among the critical factors might be in doubt. For instance, one might query if price and gender are two critical factors influencing the purchasing intention of a home video game console. Thus, questionnaires will have to be designed and distributed for data collections. From the data collected from the respondents and statistical analysis on the data, the researcher can confirm or disprove those doubtful logical consequences. So, *preliminary investigation refers to work to be done in questionnaires design, data collection and statistical analysis on the data*.
- Sometimes, the preliminary investigation could be a case study. For instance, one might figure out from the survey that motivation is a factor for a manager to be a good leader. However, the actual interactions between a manager and the employees could be complicated. To have a clear picture how a manager motivates his/her employees, the researcher will need to conduct a few case studies on a few managers and their employees what they have actually done.
- Once *preliminary investigation* has been done, the researcher would be more confident on **the contributions of the anticipated research results and the feasibility of conducting the research**. Finally, a **research plan or research proposal** can be compiled.
- The **research proposal** includes (i) the statements of the research problems to be conducted with the conceptual models to be validated. Moreover, (ii) the research methods for the research problems are stated and (iii) the contributions of the anticipated research results are presented. (iv) The schedule for completion of the research problems is sketched.
- After the preliminary investigation, it could sometimes happen that the contributions of the anticipated results are found not significant or conducting the research problem is found not so feasible. In this regard, the researcher should stop and postpone further investigation on the research problem.
- Based on my experience, the anticipated results to be obtained in a research problem will have a very high chance to be accomplished when the time a research proposal has been compiled. Besides, the paper presenting the research will have a very high chance to be published in a top journal.

6 Research Work

Once a research proposal has been compiled, the next step is to conduct the research work following the research method presented in the research proposal. In other words, the research work is to validate the hypotheses or the conceptual models stated in the proposal. If you are lucky, everything

is fine and the validation is positive. A technical report should be written and submitted for dissemination.

7 Timing

In summary, there are six works to be done by a researcher starting from the inception of a research topic to submitting a technical report for publication. The time spent on each work depends on the capability of a research. Here, I roughly estimate in below the time spent.

1. Conducting a **comprehensive survey**. [6-12 months]
2. Writing a **survey paper** with potential research problems. [2 months]
3. Conducting **preliminary investigations** on the research problems. [3-6 months]
4. Writing a **research proposal** including the research problems to be solved, the research method and the anticipated results for each problem. [2 months]
5. Conducting **research works** for the problems as stated in the proposal. [12-36 months]
6. Writing a **technical report** for disseminating the research. [6 months]

Therefore, the time spent on a research project starting from the inception of a research area to the technical paper to be submitted for publication ranges from 31 months to 64 months. If the time for the reviewing process is included, normally 4-18 months, the time spent from the inception of a research topic to the technical paper to be accepted ranges from 35 months to 82 months.