

Obtaining Factors of What Was Acquired through Questionnaire Aimed at Graduates of an Educational Institute

Yuya Yokoyama^{*}, Takaaki Hosoda[†],
Morihiro Ikemizu[‡], Tokuro Matsuo[§]

Abstract

Radical alternations of social structures have brought about the situation where the importance of relearning new knowledge and skills for adults is becoming increasingly prioritized. However, various hindrances have put Japan behind other countries when it comes to adult learners. Therefore, our study aims to analyze the fundamental factors of study motivation of adult learners and to grasp what drives their learning. Based on the prior works using a questionnaire aimed at general working adults, in this paper we create a questionnaire targeting the graduate students of our affiliations. After aggregation of the questionnaires, factor analysis was applied to the 29 questions about what was acquired during studying to obtain five factors.

Keywords: adult learner, factor analysis, factor loading, questionnaire

1 Introduction

In our current society, it is becoming more important for adult learners to learn new knowledge and skills through recurrent education, due to drastic changes of social structure, e.g. globalization, technological information, declining birthrate, aging population, etc. [1, 2]. The definition of recurrent education is periodic returns to systematic learning by workers, unemployed, retired people, or those with plenty of leisure time [1]. These people can be jointly called “adult learners.” Their motivations derive from manpower issues, social, political and cultural factors, and the desire for self-realization [3]. Thanks to this education system, adult learners can remain competitive throughout their lives and advance their careers. From these backgrounds, understanding the motivation to learn and interfering factors of adult learners is prioritized.

There are diverse sorts of study motivation and individual goals for adult learners: some may watch for an opportunity to career advancement through learning specialized knowledge and obtaining certifications; some may seek for their new career paths; some may simply have their academic interests for self-realization. Nevertheless, compared to other countries, recurrent education of adult learners in Japan has not been fully extensive. According to the Ministry of Education, Culture, Sports, Science, and Technology, the following examples are representative major obstructive factors: “Learning fee is too expensive,” “Too long working time prevents me from studying,” “I cannot find curriculum suitable for me,” etc. [4]. Many working adults have the challenges of balancing both work and home life. Especially for those above mid-level positions, the increased responsibilities of their career and home life make it more difficult for them

^{*} Advanced Institute for Industrial Technology, Tokyo, Japan

[†] Advanced Institute for Industrial Technology, Tokyo, Japan

to secure the time. In addition, other sources of concern for adult learners include time constraints as well as anxiety about study achievements. In spite of several positive experiences, e.g. they become so confident as to think they still can do what they have learnt and felt through study, the precariousness of how such achievements would be reflected in their career could also be hurdles to their continuous study [5].

Despite prior studies [5-7] in the literature on study motivation and continuous study of adult learners, to the best of our knowledge, there are yet no works analyzing their changes between before enrollment (BEF) and after graduation (AFT). Therefore, our study aims to widely analyze the study motivation of adult learners and factors for continuous study and to reveal those underlying factors. The purpose of studying also includes grasping what drives adult learners to relearn and what prompts or hinders their continuous study activities. From the viewpoint of applying factor analysis, factors on BEF and those AFT were characteristically extracted [9]. It was also suggested that the questionnaire would be effective in revealing such effects and changes [8, 9].

Based on the questionnaire aimed at general adult learners, it would be meaningful to survey the graduate students of our affiliation as well. Thus, this paper aims to explore the underlying factors of what our graduate students have learnt or acquired. Firstly, we created a questionnaire aimed at our graduate students. After aggregation of the questionnaires answered by 178 graduate schools, factor analysis was performed on the 29 questions. The analysis results yielded five factors. Compared with the factors for the former questionnaire, even though some similar factors were obtained in common, several factors indicate unique structures arising from the curriculum of our institute. It would also be implied that these factors suggest not only what our graduate students learnt and acquired but also how they utilized it after their graduation.

The rest of this paper is organized as follows: Our previous analysis performing factor analysis is summarized in Section 2. Then Section 3 addresses our questionnaire and analysis results. Considerations on the results are depicted in Section 4. Finally, Section 5 concludes the paper.

2 Previous Works

This work was launched by using a questionnaire targeting adult learners who received their diploma to investigate underlying effects and their changes [8, 9]. The questionnaire used was “Survey about Study Desire and Study Achievements of Businesspersons,” which is given by INTAGE, one of the largest Japanese marketing survey and research companies. Among the 19 main questions that form the questionnaire, 6 questions about either before enrollment (BEF) or after graduation (AFT) are used for the analysis. The number of valid samples with no missing answers to the questionnaire is 107.

Factor analysis was performed with the questions on BEF and those on AFT separately [9]. As a result of the analysis, five respective factors were obtained for both sets of the questions [9]. These factors are summarized in Table 1. These factors are named through interpreting questions with higher values of factor loadings. Although detailed explanations are omitted due to space limitations, only factor names are shown in Table 1. In comparison of these two sets of the factors, several were observed in common. For example, when it comes to a new working environment, the 3rd factor for BEF almost aligns with the 3rd factor for AFT. This tendency can be observed for another combination of the 5th factor for BEF and the 4th factor for AFT, in terms of acquiring specialized knowledge related to their work.

Table 1: Factors Obtained through a Questionnaire Aimed at General Adult Learners [9]

(a) Before enrollment (BEF)		(b) After graduation (AFT)	
Factor	Name	Factor	Name
1	Awareness around oneself	1	Building connection with school
2	Aspiration for future change	2	Fulfilling study period
3	New working environment	3	Success in new working environment
4	Arrangement of study environment	4	Acquiring knowledge linked to work
5	Desire for knowledge acquisition	5	Expanded professional network

3 Analysis of Questionnaire Specialized to Our Organization

3.1 Aim

As summarized in Section 2, a questionnaire provided by INTAGE was aimed at general adult learners across multiple institutions. At the same time, it is suggested that the tendency of adult learners at one single institution can be comprehended through this sort of questionnaire. Therefore, this paper aims to explore the underlying factors dedicated to adult learners at our institute. It would also be meaningful to compare the analysis results on our institute with those on INTAGE to see whether there are either similarities or differences.

3.2 Questionnaire Dedicated to Our Institute

Firstly, it is necessary to create a questionnaire focusing on our institute. Here, questions were about after graduation, because it is difficult for graduates to track what they had in their mind before enrollment. The main questions created were summarized in Table 2. Their answer format is either multiple-choice based on given options, or six-level choice (1: Totally Disagree, 2: Moderately Disagree, 3: Relatively Disagree, 4: Relatively Agree, 5: Moderately Agree, 6: Totally Agree). Type of answer format is given as either “Multiple-choice” or “Six-level” in the column entitled “Answer Format.”

After the framework of the questionnaire was determined, it was provided to graduates in the recent decade. The survey was conducted online in February 2025. The questionnaire was created on Google Form. After the one-month survey duration, the answer forms submitted were aggregated. The number of answer samples is 178. Since most of the questions were set as required, no missing values were included in those answer samples.

Table 2: Main Questions of a Questionnaire Aimed at Graduates of Our Institute

No.	Question Content	Answer Format
Ins_Q1	Basic information	Multiple-choice
Ins_Q2	In retrospect of your study and attitude as a graduate student, to what degree do you think you acquired and understood knowledge?	Six-level
Ins_Q3	In regard to the extent of exercising your competency in the actual world obtained through PBL, we would like to ask you about your abilities related to project fulfillment.	Multiple-choice
Ins_Q4	In regard to the extent of exercising your competency in actual world obtained through PBL, we would like to ask you about the ability related to adaptation to environment	Six-level
Ins_Q5	Is what you have obtained during a graduate school useful enough to enrichen your life after graduation? (e.g. academic factors such as classes, lectures, PBL etc., extracurricular activities and friendship)	Six-level
Ins_Q6	Please tell us about your present occupation	Multiple-choice
Ins_Q7	Please tell us about the network with our organization after graduation	Multiple-choice

3.3 Scope of Analysis

Among the main questions shown in Table 2, in this paper, those whose answer formats were Six-level are extracted and used for the subsequent analysis. For Ins_Q2 and Ins_Q5, both “Multiple-choice” questions and “Six-level” ones are in the mixture. For these cases, only the “Six-level” questions were extracted. Therefore, questions Ins_Q2, Ins_Q3, Ins_Q4 and Ins_Q5 are the feature values to be utilized for the analysis. These questions are shaded in Table 2 to emphasize that they are the feature values to be used for the subsequent analysis.

Table 3: Subdivided “Six-level” Questions

No.	Subdivided Question Content	No.	Subdivided Question Content
Ins_Q2_1	Knowledge about social science	Ins_Q3_1	Analytical skills
Ins_Q2_2	Knowledge about humanities	Ins_Q3_2	Problem resolution skills
Ins_Q2_3	Knowledge about natural science	Ins_Q3_3	Information literacy
Ins_Q2_4	Knowledge and skills about extensive academic discipline	Ins_Q3_4	Creativity
Ins_Q2_5	Broad perspectives and appreciation of culture	Ins_Q3_5	Ability to plan and implement
Ins_Q2_6	Ethical view and code of conduct required in society	Ins_Q3_6	Presentation skills
Ins_Q2_7	Profound knowledge and skills on diverse specialties	Ins_Q4_1	Self-study
Ins_Q2_8	Specialized knowledge of completed course	Ins_Q4_2	Communication
Ins_Q2_9	Eagerness and proactivity to voluntarily solve problems in the actual world	Ins_Q4_3	Cooperation
Ins_Q2_10	Practical language ability dealing with global era	Ins_Q4_4	Leadership
Ins_Q2_11	Skills and knowledge for cooperation and communication with people who have different cultures	Ins_Q4_5	Adaptability
Ins_Q2_12	The perspective and knowledge to globally understand	Ins_Q5_1	For work
Ins_Q2_13	Knowledge and skills to contribute to development of local economy	Ins_Q5_2	For higher income and rank
Ins_Q2_14	Knowledge and skills to broadly contribute to global science	Ins_Q5_3	For enrichment of your private life
		Ins_Q5_4	For social activities and contribution besides your work

Each main question includes subdivided questions. In the scope of “Six-level” format questions, the numbers of subdivided questions for Ins_Q2, Ins_Q3, Ins_Q4, and Ins_Q5 are 14, 6, 5 and 4, respectively. Taking an example of main question Ins_Q2 (“Acquisition”), its subdivided questions are denoted as “Ins_Q2_1,” “Ins_Q2_2,” ..., and “Ins_Q2_14.” These notations apply to Ins_Q3, Ins_Q4, and Ins_Q5 as well. The respective subdivided “Six-level” questions are summarized in Table 2. In total, these 29 subdivided questions are utilized for factor analysis.

3.4 Factor Analysis

In order to observe the factors of what graduates acquired as students, factor analysis is applied to the 29 feature values summarized in Table 3. In executing factor analysis, it is necessary to determine either of the following criterion to determine the numbers of factors; “their eigenvalue over 1.0” or “cumulative contribution ratio at least 80%”. Of these two, according to the former standard, the number of factors is set to 5. Factor loadings with Varimax rotation are shown in Table 4. The factor loadings with absolute values at least 0.5 are shaded to emphasize them because of their potential significant interpretations. Their detailed interpretations are given in the subsequent section.

Table 4: Factor Loadings of 5 Factors

Question	Factor1	Factor2	Factor3	Factor4	Factor5	Question	Factor1	Factor2	Factor3	Factor4	Factor5
Ins_Q4_2	0.874	0.172	0.203	0.120	0.053	Ins_Q2_8	0.276	0.174	0.826	0.275	0.018
Ins_Q4_3	0.814	0.116	0.231	0.148	-0.011	Ins_Q2_7	0.256	0.218	0.810	0.242	0.009
Ins_Q4_4	0.753	0.168	0.107	0.192	0.092	Ins_Q2_9	0.308	0.243	0.638	0.327	0.210
Ins_Q4_5	0.749	0.127	0.197	0.204	0.132	Ins_Q2_4	0.111	0.291	0.589	0.028	0.631
Ins_Q3_6	0.672	0.181	0.143	0.228	0.111	Ins_Q2_5	0.152	0.312	0.584	-0.062	0.566
Ins_Q3_2	0.626	0.075	0.159	0.533	0.250	Ins_Q3_1	0.491	0.166	0.147	0.553	0.333
Ins_Q4_1	0.568	-0.004	0.338	0.377	0.109	Ins_Q5_1	0.348	0.111	0.379	0.538	0.138
Ins_Q3_3	0.531	0.159	0.175	0.578	0.221	Ins_Q2_1	0.118	0.345	-0.002	0.223	0.649
Ins_Q2_12	0.100	0.882	0.166	0.109	0.200	Ins_Q2_3	0.064	0.125	0.187	0.218	0.574
Ins_Q2_14	0.106	0.866	0.174	0.189	0.229	Ins_Q2_2	0.151	0.340	-0.073	0.168	0.548
Ins_Q2_10	0.150	0.728	0.134	0.043	0.156	Ins_Q2_6	0.212	0.277	0.417	0.130	0.281
Ins_Q2_13	0.115	0.680	0.238	0.175	0.320	Ins_Q5_3	0.237	0.228	0.254	0.496	0.218
Ins_Q2_11	0.341	0.550	0.371	0.089	0.162	Ins_Q3_5	0.381	0.123	0.075	0.414	0.208
						Ins_Q3_4	0.453	0.136	0.148	0.484	0.192
						Ins_Q5_4	0.208	0.410	0.186	0.363	0.101
						Ins_Q5_2	0.246	0.178	0.355	0.401	-0.008

4 Considerations

According to the questions with factor loadings over 0.5, interpretations are as follows:

- 1st factor is composed of questions about adaptation to environment (Q4) such as Ins_Q4_2 “Communication,” Ins_Q4_3 “Cooperation,” etc. It also included those about project fulfillment (Q3), such as Ins_Q3_6 “Presentation skills,” Ins_Q3_2 “Problem resolution skills,” etc. These questions indicate interpersonal relationships and practical work on behaviors, e.g. communication, corporation, etc. Hence, this factor is named “practical skills.”
- 2nd factor consists of the questions Ins_Q2_12 “The perspective and knowledge to globally understand,” Ins_Q2_14 “Knowledge and skills to broadly contribute to global science,” etc. These components show the competencies of international perspectives, e.g. language ability, cross-cultural understanding, etc. Therefore, this factor is named “global-minded.”
- 3rd factor is dominated by the questions Ins_Q2_8 “Specialized knowledge of completed course,” Ins_Q2_7 “Profound knowledge and skills on diverse specialties,” etc. They are the contents about integrated usage of knowledge, broad education, and spontaneity. Hence, this factor is named “comprehensive strength of specialty and education.”
- 4th factor is made up of the questions Ins_Q3_3 “Information literacy,” Ins_Q3_1 “Analytical skills,” etc. These are skills with which knowledge is applied to practical work, such as information literacy and analytical skills. Hence, this factor is named “practical application.”
- 5th factor mainly comprises the questions Ins_Q2_1 “Knowledge about social science,” Ins_Q2_4 “Knowledge and skills about extensive academic discipline,” etc.” They indicate the spread of multidisciplinary education, which is represented by basic knowledge of human, social, and natural science. Thus, this factor is named as “multidisciplinary education.”

From these explanations, each factor is characteristically interpreted to convey distinctive abilities and competencies that can be learnt and acquired at our institute.

5 Conclsn

The purpose of this paper is to reveal the latent factors of what our graduate students have learnt or acquired. A questionnaire aimed at our graduate students was distributed to graduates of a recent decade. After gathering 178 samples, factor analysis was conducted on the 29 questions,

leading to obtaining five factors. These factors certainly imply characteristic structures deriving from the curriculum of our institute.

There are several requirements and future work that must be addressed. Firstly, on top of 29 subdivided questions used for the analysis, questions with multiple-choice answer types must be analyzed to explore profound understandings of factors of study motivations of adult learners. In addition, the characteristics of adult learners, e.g. age, specialty, occupation, etc., should be taken into consideration as well. Besides, revealing the factors of what prevents adult learners from studying is also addressed as one of our future works.

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