

Research on Improving the Education System for Cultivating Expert Talent in the Aerospace Sector

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Abstract

Objectives: Survey of aerospace-related major students was conducted to evaluate their satisfaction levels (or importance levels) for the various curriculum and support systems of convergence-oriented talent development. **Methods/Statistical Analysis:** Statistical forecast analysis software IBM SPSS (Statistical Package for the Social Sciences) was utilized for the research data of the aerospace major students' understanding of their curriculum. This data can be used as base data for future curriculum settings. **Findings:** The difference between this study and prior research on convergence curriculum is as follows. First, whereas the subject of previous research was convergence education based on the convergence of disparate fields of study, this research dealt specifically with the aerospace field where cutting-edge technologies converge. Second, while previous studies focused on the general direction of convergence education and its teachers, this research proposed a direction for convergence education from the learners' point of view. **Application/Improvements:** The research analyzed which factors affected the development of convergence-oriented talent development. The results may be used for the future planning and establishment of education programs to facilitate convergence-oriented talent development.

Keywords: Aerospace Sector, Convergence Education, Curriculum, Education System, PASW Statistic

1. Introduction

Many universities today face a variety of social, industrial and academic issues. A low birth rate has led to a continued reduction in the student-age population. Also, the competition to secure outstanding student resources is not only a regional problem within each country, but a problem at a national level as well. Furthermore, numerous corporations are seeking graduates capable of creative problem-solving based on diverse fields of study and technologies and they expect the university curriculum to reflect such demands. Ultimately, the universities of today are transitioning from the ivory towers of academia into higher education institutions that produce human resources that can solve various social issues.

In response to such diverse demands, many universities are proposing convergence education and convergence-oriented talent as the solution. Universities in advanced countries have already designed and are running new

curriculum through interdisciplinary convergence. They are also offering joint curriculum encompassing a wide range of fields over and above the existing curriculum focused on a single given technology. There is substantial support and investment into convergence education and research at the national level as well.

This research aims to discover the satisfaction levels for curriculum designed for cultivating convergence-oriented talent. The research also focuses on the factors considered important by the learners and provides the base data for developing, planning and executing a curriculum designed to nurture convergence-oriented human resources in the future. This curriculum focuses on the aerospace field, where convergence is between cutting-edge technologies rather than between disparate fields such as humanities and sciences. There is also a focus on the learners instead of the teachers.

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2. Prior Research

2.1 The Need for Convergence-Oriented Talent

There are various ongoing attempts at defining convergence-oriented talent. While Toyota of Japan defines convergence-oriented talented individuals as those who show professional excellence in a given field and expert knowledge of related areas, Samsung of Korea defines them as those with professional excellence in a given field as well as general knowledge of other areas, such as communication skills and the ability to work with others. According to Wang-dong Kim (2012), convergence-driven people have also been defined as those that produce creative outcomes by embodying, utilizing, or participating in the expert knowledge of two or more fields. Furthermore¹, Soon-yo Lee (2013) even proposed to categorize convergence-oriented talent into embodiment-style, utilization-style and participation-style talent².

The need for convergence-oriented talent can be found in various studies and investigations. Bostock (2008) stated that it is necessary to cultivate “specializing generalists” with expert knowledge and technology in multiple areas in order to solve problems that cannot be overcome with previous knowledge³, while Hye-young Kim (2013) asserted that we need talented individuals with a fresh view rather than those with expert knowledge in a single field⁴. In addition, per the results of an investigation by the Korea National Industrial Convergence Center (KNICC), over 80% of the responding corporations thought “convergence-oriented human resources are important” and over 50% answered that “they will prioritize the hiring of and provide better treatment for convergence-oriented human resources in comparison to general hires”⁵.

2.2 Research on Convergence Education

From reviewing the recent papers on convergence education, it can be seen that methodologies on providing such training have been proposed in a variety of fields reflecting their specific characteristics, such as family science, life sciences and Korean traditional music⁶⁻⁸.

Furthermore, research is ongoing on analyzing and raising issues with the convergence education programs of numerous Korean universities and proposing improvement directions thereof. Young-ju Hur (2013) pointed out that for many Korean universities, convergence education programs suffer from a lack of established concepts

and paradigms for convergence training, limitations on interdisciplinary convergence due to departmental selfishness, deficiency in the effective operation of diverse training methods and a lack of suggested directions for the overall improvement of university-level convergence style education⁹. Hye-young Kim (2013) proposed plans for designing a basic convergence curriculum based on the current status of convergence education and existing research¹⁰. Dong-hyun Son (2008) argued that convergence training methodology should aim for a diversified approach and problem-solving for various problem areas rather than for acquiring a large amount of knowledge¹¹.

Additionally, Hyo-jeong Hong and Jae-kyung Lee (2015) mentioned that liberal arts education is needed to reinforce the capacity for entrepreneurial convergence-oriented thinking and proposed methods for developing liberal arts curriculum¹². Sang-won Lee et al. (2013) investigated and analyzed the design convergence programs of Korean universities to propose ways for improvements¹³.

As seen above, much research has been carried out on the necessity for convergence-oriented talent and on convergence education for cultivating such talent. However, most theses are either solely focused on the theory aspect such as the general direction and goal setting for convergence education or limited to proposing convergence education programs centered on a specific academic field. Research is also active on the curriculum targeting convergence between fields of great academic differences, such as design and engineering.

As such, this paper will explore and analyze the general status of understanding and satisfaction levels on convergence-style talent development education among university students attending undergraduate programs in aerospace, a field where cutting-edge technologies converge, in order to propose a direction for convergence-oriented talent development from the learners’ point-of-view. The results obtained through this research will be available as reference data for future convergence education program planning and establishment.

3. Survey Design

This survey was constructed in order to analyze the satisfaction levels of convergence education curriculum in the aerospace undergraduate program and the factors that affect them, so that the results could become a reference in the future planning and execution of convergence education programs. That is, the aerospace undergraduate

program not only greatly reinforced the core curriculum, but also incorporated non-major classes and went through a variety of related re-organization in terms of administration as well. The survey was structured to reflect this.

As can be seen in Figure 1, the first level of the survey consisted of three categories: Regular curriculum, convergence curriculum and administrative areas. On the second level, the regular curriculum was further divided into general items and major curriculum items; the convergence curriculum into general items, non-major curriculum items and teaching; and the administrative areas into student support system and academic process.

In addition, as can be seen in Figure 2, the survey consisted of questionnaires that asked about total satisfaction and about the overall satisfaction for convergence-oriented talent development at each level, enabling the results to reveal which field has the greatest impact.

All questions were answered along an equal interval scale (very low – low – high – very high) for the level of importance (or satisfaction). Also, for a detailed analysis of the survey results, the responders' information was also collected. The data collected included gender, year and major.

The survey was conducted with over 500 students in aerospace-related undergraduate programs and was conducted through group meeting surveys.

MAJOR	GENERAL	◦ Reflecting standards, Practice & Infra, etc.
	SUBJECT	◦ Professionally, Student needs, Industrial needs, etc.
CONVERGENCE	GENERAL	◦ Student needs, Contents, Connectivity, Convergence certification, etc.
	SUBJECT	◦ B737 control, MEDICAL, Conv. Cert. Program Personality, Pilot experience, etc.
	TEACHING	◦ Supporting Teaching, Training Prof., etc.
ADMINISTRATION	PROCESS	◦ Curriculum Structure, Administration Structure
	SUPPORT	◦ Supporting circle, registration, infra/equipment, start-up, etc.

Figure 1. Questionnaire structure.

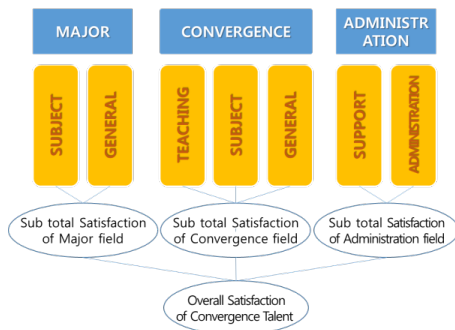


Figure 2. Questionnaire restructure.

4. Analysis Framework

The raw data collected from the field survey went through editing, coding and data cleaning. The data was then used for statistical analysis as shown in Figure 3 by using PASW Statistic 18.0.0 (ver. Korean).

This research aimed to provide basic data needed to plan and carry out a curriculum designed to nurture talented individuals with interdisciplinary abilities through an undergraduate aerospace program.

First, basic statistics for each of the survey items was obtained and compared through data exploration. In the second stage, we checked if there was a correlation between the overall level of satisfaction and the level of satisfaction for each specific category in the context of nurturing convergence-oriented talented individuals. In the third stage, we looked to see if there was any difference in items of satisfaction depending on the type of responder. Finally, we investigated the factors that affect the development of individuals with interdisciplinary abilities.

We identified the factors that the responding students believed to be important for nurturing convergence-oriented talent through analyzing each stage. We also drew conclusions that could be applied to the future planning of curriculum for developing talented individuals with interdisciplinary abilities.

5. Analysis Result

5.1 Basic Statistic

500 people responded to the survey. Responses from 495 of those people, excluding those that resulted in survey errors, were used for the analysis. The number of responses based on the respondent type is shown in Table 1.

The average and variance for all survey items are presented. The level of satisfaction for the overall curriculum for nurturing convergence-oriented talented

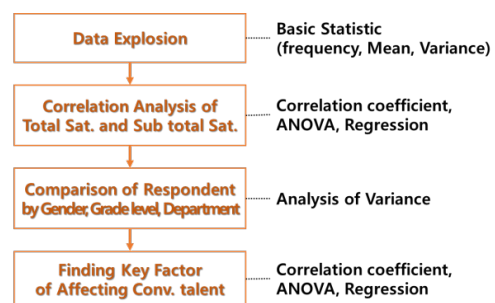


Figure 3. Analytical process using PASW.

Table 1. Basis statistics by survey questions

Lev.1	Lev.2	Lev.3	N	mean	var.
Major	Subject	major_professionality	495	3.35	.341
		major_practice_infra	495	3.25	.422
		major_practice_satisfaction	495	3.16	.510
		major_theory_prac_ratio	495	3.07	.518
	General	major_gen_stand.	495	3.17	.426
		major_gen_ind.	495	3.25	.413
		major_gen_needs.	495	3.14	.528
Sub. Total Satisfaction	major_satisfaction	495	3.20	.415	
Convergence	Subject	conv_non-major_subj_personality.	495	2.93	.707
		conv_non-major_subj_visiting_prog.	495	2.94	.762
		conv_non-major_subj_expert_lecture.	495	3.19	.510
		conv_non-major_subj_b737.	495	2.73	1.042
		conv_non-major_subj_pilot.	495	3.23	.612
		conv_non-major_subj_MedichiProg.	495	3.20	.542
	Teaching	conv_teaching_Prof.	495	3.20	.426
		conv_teaching_pilot.	495	3.11	.506
		conv_teaching_supp.	495	3.40	.389
	General	conv_gen_convergence_certification	495	3.05	.530
		conv_gen_flexsubject.	495	3.12	.622
		conv_gen_major_connect.*	311	2.98	.506
		conv_gen_contents.	495	3.02	.483
		conv_gen_stud_needs	495	2.94	.553
	conv_gen_strengthen_graduation_req.	495	3.18	.489	
	Sub. Total Satisfaction	conv_satisfaction	495	3.06	.577
	Administration	Support	admin_supp_circle.	495	2.51
admin_supp_study.			495	2.92	.654
admin_supp_society			495	2.83	.762
admin_supp_epuip.			495	2.80	.739
admin_supp_start-up			495	2.91	.689
admin_supp_counsel.			495	2.86	.699
Process		admin_process_structure	495	2.86	.765
		admin_process_admin.	495	2.89	.699
Sub. Total Satisfaction		admin_satisfaction	495	3.00	.571
Total satisfaction	overall_satisfaction	495	3.06	.436	

* Grade1 is not response

individuals was very high at 3.06, while satisfaction for each of the specific items – major curriculum, convergence

curriculum and administrative areas – was also very high at 3.20, 3.08 and 3.00, respectively.

While the results show an overall high level of satisfaction for all items, the level of satisfaction for the administrative areas was found to be lower when compared to other areas.

According to the analysis of the basic statistics, most respondents exhibited high levels of satisfaction. Therefore, it is deemed appropriate to only analyze those results that have statistical significance such as comparing satisfaction levels by every detailed category.

5.2 Correlation Analysis of Total Satisfaction and Sub-Total Satisfaction

First, the impact on convergence talent development curriculum satisfaction levels for regular curriculum, convergence curriculum and administrative areas were

examined. For this purpose, a regression analysis was carried out, with the total satisfaction levels for convergence talent development curriculum as the dependent variable and the sub-total satisfaction levels for regular curriculum, convergence curriculum and administrative areas as the independent variables.

Results display a p-value <0.05, the Variance Inflation Factor (VIF) per independent variable indicating collinearity is below 1.5 in all cases and the Durbin-Watson value validating the independence of the residuals was at 1.8. This lead to the analysis conclusion that all base assumptions for a regression model have been satisfied. Furthermore, the adjusted R-square value (R2) was relatively high at 0.467 and the coefficients of all independent variables were significant (p-value <0.05). This

Table 2. Basis statistics of the respondents types

Division	Gender				Grade				Department			
	type	N	mean	variance	type	N	mean	variance	type	N	mean	variance
Overall Satisfaction	Male	430	3.07	0.461	Grade 1	184	3.16	0.410	Dept.1	112	2.79	0.381
	Female	65	2.98	0.265	Grade 2	137	2.95	0.431	Dept.2	112	3.41	0.532
	Total	495	3.06	0.436	Grade 3	115	2.99	0.412	Dept.3	100	2.94	0.299
					Grade 4	59	3.12	0.520	Dept.4	107	3.05	0.422
					Total	495	3.06	0.436	Dept.5	64	3.11	0.258
									Total	495	3.06	0.436
Major Satisfaction	Male	430	3.23	0.427	Grade 1	184	3.25	0.418	Dept.1	112	2.96	0.341
	Female	65	3.03	0.312	Grade 2	137	3.10	0.357	Dept.2	112	3.61	0.313
	Total	495	3.20	0.415	Grade 3	115	3.18	0.484	Dept.3	100	2.99	0.353
					Grade 4	59	3.31	0.388	Dept.4	107	3.20	0.461
					Total	495	3.20	0.415	Dept.5	64	3.23	0.309
									Total	495	3.20	0.415
Conv. Satisfaction	Male	430	3.07	0.594	Grade 1	184	3.11	0.561	Dept.1	112	2.96	0.512
	Female	65	3.00	0.469	Grade 2	137	2.95	0.637	Dept.2	112	3.21	0.813
	Total	495	3.06	0.577	Grade 3	115	3.04	0.445	Dept.3	100	2.85	0.513
					Grade 4	59	3.20	0.717	Dept.4	107	3.19	0.455
					Total	495	3.06	0.577	Dept.5	64	3.13	0.460
									Total	495	3.06	0.577
Admin. Satisfaction	Male	430	3.04	0.544	Grade 1	184	3.01	0.650	Dept.1	112	2.91	0.424
	Female	65	2.75	0.688	Grade 2	137	2.96	0.521	Dept.2	112	3.35	0.553
	Total	495	3.00	0.571	Grade 3	115	2.95	0.541	Dept.3	100	2.62	0.824
					Grade 4	59	3.17	0.488	Dept.4	107	3.08	0.399
					Total	495	3.00	0.571	Dept.5	64	3.00	0.317
									Total	495	3.00	0.571

indicates that the satisfaction levels for the convergence talent development curriculum are positively correlated with that of the regular curriculum, convergence curriculum and administrative areas, with the major curriculum having the biggest impact with a coefficient of 0.351.

5.3 Comparison of Respondents Type

Next, analysis was conducted to determine if there were any variances in the satisfaction levels of the convergence talent development curriculum, major curriculum, convergence curriculum and administrative areas, according to the survey respondent type.

In this research, respondent types were categorized by gender, year and major. Variances in the averages of satisfaction levels by responder type were compared through analyzing the variance for each type.

Table 3 shows the ANOVA results for determining whether satisfaction levels vary by gender. From examining the basic statistics, we can see that the respondents generally exhibited lower satisfaction compared to male respondents. However, the ANOVA results by gender indicate there is no variance in satisfaction levels by

gender, with the p-values of overall satisfaction levels and the convergence curriculum satisfaction levels at 0.333 and 0.476, respectively. However, the satisfaction levels for the major curriculum and administrative areas differed by gender and the females' satisfaction levels were found to be lower.

And it shows ANOVA results for analyzing variance in overall satisfaction levels by year. In all satisfaction items, levels were revealed to be slightly higher for the freshmen and seniors in comparison to the sophomores and juniors. However, according to the ANOVA outcomes, the total satisfaction levels for convergence-oriented talent development curriculum were found to have varied by year, with the p-value at 0.018, while the satisfaction levels for the major curriculum, convergence curriculum and administrative areas were found to have varied little by year.

In order to understand in detail how the total satisfaction levels vary by year, a post hoc test was performed. As can be seen in Figure 9, the total satisfaction level variable did not satisfy the homogeneity of variance assumption. Looking at the Tamhane's T2 test

Table 3. Satisfaction analysis of the respondents types

Division		Gender					Grade					Department				
		Sum of Squares	df	mean Square	F	Sig.	Sum of Squares	df	mean Square	F	Sig.	Sum of Squares	df	mean Square	F	Sig.
Overall Satisfaction	Between Groups	0.409	1	0.409	0.939	0.333	4.389	3	1.463	3.406	0.018	23.276	4	5.819	14.849	0.000
	Within Groups	214.892	493	0.436			210.912	491	.430			192.025	490	0.392		
	Total	215.301	494				215.301	494				215.301	494			
Major Satisfaction	Between Groups	2.143	1	2.143	5.203	0.023	2.457	3	0.819	1.983	0.116	29.276	4	7.319	20.385	0.000
	Within Groups	203.057	493	0.412			202.743	491	0.413			175.924	490	0.359		
	Total	205.200	494				205.200	494				205.200	494			
Conv. Satisfaction	Between Groups	0.293	1	0.293	0.508	0.476	3.471	3	1.157	2.017	0.111	9.993	4	2.498	4.451	0.002
	Within Groups	284.765	493	0.578			281.588	491	0.573			275.065	490	0.561		
	Total	285.059	494				285.059	494				285.059	494			
Admin. Satisfaction	Between Groups	4.534	1	4.534	8.056	0.005	2.196	3	0.732	1.284	0.279	29.670	4	7.418	14.404	0.000
	Within Groups	277.466	493	0.563			279.804	491	0.570			252.330	490	0.515		
	Total	282.000	494				282.000	494				282.000	494			

Table 4. Post hoc test results on total satisfaction for convergence talent development by year

Dependent Variable	(I) Grade	(J) Grade	Mean Difference (I-J)	Std. Err.	Sig.	90% Confidence interval	
						Lower Bound	Upper Bound
Overall Satisfaction	1_grade	2_grade	0.214	0.073	0.022	0.04	0.39
		3_grade	0.172	0.076	0.142	-0.01	0.35
		4_grade	0.044	0.105	0.999	-0.21	0.30
	2_grade	1_grade	-0.214	0.073	0.022	-0.39	-0.04
		3_grade	-0.042	0.082	0.996	-0.24	0.15
		4_grade	-0.170	0.109	0.548	-0.43	0.09
	3_grade	1_grade	-0.172	0.076	0.142	-0.35	0.01
		2_grade	0.042	0.082	0.996	-0.15	0.24
		4_grade	-0.127	0.111	0.830	-0.40	0.14
	4_grade	1_grade	-0.044	0.105	0.999	-0.30	0.21
		2_grade	0.170	0.109	0.548	-0.09	0.43
		3_grade	0.127	0.111	0.830	-0.14	0.40

outcomes, there was variance between the freshmen's and sophomores' total satisfaction levels while no variance was found among the other groups.

In conclusion, variance has only been found in total satisfaction levels for convergence talent development by year. While freshmen had higher levels of satisfaction, sophomores' satisfaction levels were relatively lower.

In terms of the major, substantial variances were found in total satisfaction and sub-total satisfaction by detailed category of the convergence-oriented talent development curriculum. Dept 1 and Dept 3 were found to have low average satisfaction compared to other departments for all of the detailed categories. The results of ANOVA conducted to ascertain the statistically significant variances are as shown in Table 3. With all p-values for the detailed categories smaller than 0.05, we can determine that there are variances in levels of satisfaction.

5.4 Finding Key Factor of Affecting Convergence Talent

The fact that the overall satisfaction for convergence-oriented talent development curriculum has correlations with satisfaction for the major curriculum, convergence curriculum and administrative areas was confirmed by the analysis results above. Next, the research proceeded to extract the factors affecting satisfaction levels by detailed category. For this purpose, linear regression analysis was performed with the satisfaction levels by detailed category as dependent variables and the

corresponding detailed items as independent variables. However, because the model could become over-fitting when all surveyed items are used as independent variables and in order to identify the factors that have statistically significant impact on the dependent variable - overall satisfaction levels by detailed category - and the extent of their impact by removing statistically insignificant independent variables, a stepwise linear regression analysis was carried out. In doing so, the probability of F to enter for independent variables was more likely to occur when it was 0.05 or smaller and the probability of F to remove for independent variables occurred when it was greater or smaller than 0.1.

While there were seven detailed items under the major curriculum, only four independent variables were entered. In the generated regression model, the ANOVA results showed p-values of less than 0.05, indicating that the regression model was significant. The model also exhibited a relatively high explanatory power with an adjusted R-square value of 0.542. Also, the Durbin-Watson value was 1.961, confirming the independence assumption for the residuals. The coefficients of the entered independent variables all had p-values of less than 0.05 and were therefore significant. With a VIF value of 2 or less, it was also determined that there were no problems with collinearity.

According to the stepwise regression analysis, the factors that affected the major curriculum were "major subject lab course", "appropriate mix of theory class and lab train-

ing”, “expertise level of major subject” and “incorporation of student requests in major subject course”. The items that were excluded due to low statistical significance level were “satisfactory infrastructure for lab training”, “curriculum compliant with international standards” and “degree of incorporating the needs of the industry in the field”.

While the survey on the convergence curriculum consisted of 15 questions in total, only six of those questions were found to be applicable to the regression model. Furthermore, the analysis results of the extrapolated regression model had p-values of 0.05 or less, a Durbin-Watson value of 1.864 and VIF values per independent

Table 5. Key factors of affecting convergence talent

Lev.1	Lev.2	Lev.3	Sig.
Major	Subject	major_professionality	0.000
		major_practice_infra	0.767
		major_practice_satisfaction	0.000
		major_theory_prac._ratio	0.000
	General	major_gen_stand.	0.882
		major_gen_ind.	0.856
		major_gen_needs.	0.000
Sub. Total Satisfaction	major_satisfaction		
Convergence	Subject	conv_non-major._subj._personality.	0.008
		conv_non-major._subj._visiting_prog.	0.002
		conv_non-major._subj._expert._lecture.	0.192
		conv_non-major._subj._b737.	0.987
		conv_non-major._subj._pilot.	0.009
		conv_non-major._subj._MedichiProg.	0.006
	Teaching	conv_teaching._Prof.	0.259
		conv_teaching._pilot.	0.614
		conv_teaching._supp.	0.310
	General	conv_gen._convergence_certification	0.250
		conv_gen._flexsubject.	0.298
		conv_gen._major_connect.*	0.291
		conv_gen._contents.	0.075
		conv_gen._stud._needs	0.001
	conv_gen._strengthen._graduation_req.	0.002	
Sub. Total Satisfaction	conv_satisfaction		
Administration	Support	admin_supp_circle.	0.275
		admin_supp_study.	0.033
		admin_supp_society	0.053
		admin_supp_epuip.	0.001
		admin_supp_start-up	0.337
		admin_supp_counsel.	0.738
	Process	admin_process_structure	0.000
		admin_process_admin.	0.000
	Sub. Total Satisfaction	admin_satisfaction	

variable of 2.6 or below. All p-values were 0.05 or less, confirming the model as significant and the generated model's adjusted R-square value was 0.491.

The item that had the biggest impact on the overall satisfaction level of the convergence curriculum was found to be "incorporation of student requests" for the convergence curriculum, with a standardized beta value of 0.208. Other factors that were included were "character and intellect building courses", "reinforcement of graduation requirements reflecting convergence curriculum", "field training program visiting leading countries (or corporations) in the aerospace industry" and "Medici-style aerospace talent development program". On the other hand, there were nine items excluded due to low statistical insignificance, which were "industry field expert lectures", "relevance to major subject", "content appropriateness" and all items related to "teaching".

Lastly, the stepwise linear regression analysis results for the administrative areas are as follows:

First, with the ANOVA analysis outcomes (p-value <0.05) all showing statistically significant results (p-value <0.05, Durbin-Watson value 1.932, VIF value per independent variable <2.2, p-value <0.05, adjusted R-square value 0.547), the generated regression model is considered statistically significant.

The survey for the administrative areas consisted of a total of eight questions and four items were entered for their statistical significance. Among them, "composition of education support framework" was revealed to have the greatest impact on the satisfaction levels for the administrative areas. Additionally, "composition of general administrative framework", "infrastructure support" and "academic support" were identified as the factors affecting satisfaction levels. On the contrary, the items excluded from the model were "support for club activities", "support for seminar participation", "business start-up support" and "issues counseling support".

6. Conclusion and Future Research

6.1 Conclusion

The difference between this study and prior research on convergence curriculum is as follows. First, whereas the subject of previous research was convergence education based on the convergence of disparate fields of study, this research dealt specifically with the aerospace field

where cutting-edge technologies converge. Second, while previous studies focused on the general direction of convergence education and its teachers, this research proposed a direction for convergence education from the learners' point of view. For this purpose, the survey responses from some 500 aerospace undergraduate students were statistically analyzed and the following conclusions could be drawn.

First of all, the students considered all areas of the major curriculum, convergence curriculum and administrative support as important for convergence-oriented talent development and considered the major curriculum as the most important among them.

From comparing the satisfaction levels for convergence-oriented talent development according to the students' types - gender, year and major - as well as according to the detailed categories, we can see that differences existed by type.

Per the results of analysis by gender, although there was no variance in satisfaction levels for convergence-oriented talent development and the convergence curriculum, there were differences between the genders in the average satisfaction levels for the major curriculum and the administrative areas. This can be construed to the belief that, due to the characteristics of the aerospace field, the programs were being run in a male-centric fashion.

Reviewing the analysis outcomes by year, satisfaction levels varied for convergence-oriented talent development, with variances between the satisfaction of freshmen and sophomores. This is deemed to reflect the curriculum of the university that was the subject of this research. For most Korean universities, while the curriculum for the freshman year is centered around common engineering courses, the sophomore year curriculums focus transitions to major subjects and this is believed to induce negative sentiment. Therefore, in planning curriculum for the purpose of convergence-oriented talent development, it would be necessary to reduce the extent of change between freshman and sophomore years.

The analysis results of satisfaction level comparison by department show that Dept 2 is exhibiting a relatively higher satisfaction compared to others while Dept 1 and Dept 3 are showing low levels of satisfaction. While this must be gauged against an analysis of the departmental characteristics, it can be stated that the results imply the necessity for differentiating the curriculum for convergence-oriented talent development according to the characteristics of each department.

Looking at the items impacting satisfaction levels for the major curriculum, the identified factors were expertise level of major curriculum, incorporation of student requests into the major subject courses, major subject lab courses and an appropriate mix between theory and lab training.

Examining the items that have an effect on the satisfaction levels of the convergence curriculum, the factors of incorporating student request and reinforcement of graduation requirements reflecting the convergence curriculum were found to be considered positively by the students. In addition, character and intellect building courses, flight field practice courses, aerospace industry leading country (or corporation) visitation programs and Medici-style aerospace talent development programs were evaluated as non-major courses that were helpful towards convergence-oriented talent development. On the other hand, factors related to the teaching of convergence curriculum were found to have a substantially low impact on the satisfaction levels for the convergence curriculum.

In the administrative areas, a general education support framework and administrative support framework were found to affect the satisfaction levels for the administrative areas. Student support systems such as club activity support, business start-up support and issues counseling support were revealed to have a very low effect on administrative area satisfaction.

6.2 Future Research Topics

In this research, a survey of aerospace-related major students was conducted to evaluate their satisfaction levels (or importance levels) for the various curriculum and support systems of convergence-oriented talent development. The research analyzed which factors affected the development of convergence-oriented talent development. The results may be used for the future planning and establishment of education programs to facilitate convergence-oriented talent development.

It is believed that further examination such as analyzing the results according to student types and satisfaction levels comparison reflecting the major subject characteristics will yield a more diverse set of information.

In order to develop curriculum for convergence-oriented talent development, research and analysis should be carried out, not only for the students as the recipients of such education, but also for the organizations that demand human resources for the aerospace

industry such as corporations and research institutes, in addition to the higher education instructors. In particular, inter-comparison of the level of understanding on the convergence-oriented talent among students, educational institutions and industry field, including their respective needs and desired future direction to meet such needs would be greatly helpful in developing curriculum for cultivating convergence-oriented talent that the society is demanding.

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