Classroom learning vs E-learning (Cyber-learning) in Statistical Training Institute of Statistics Korea: Lessons Learned

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I. Introduction

The Korean statistical system is decentralized. As of July 2014, 923 various kinds of official statistics are produced by 303 government agencies and 86 non-government agencies. The Statistical Training Institute is the only government organization that performs the statistical education in Korea. As the mission of STI is to foster global statistical leaders and to offer statistical training in harmony with citizens, the target of statistical training of STI is not only statistics producers but also statistics users. Depending on training targets, programs vary and their contents and training methods vary depending on the target of training programs.

Under the limited budget and human resources, the STI training must be very effective to accommodate the myriad of trainees and the multitude of needs arising from rapid social, economic, and administrative changes. In particular, all government officials of Korea must finish 100 hours of learning per year and statistical training is one of the indicators by which local governments are evaluated. Despite these overall favorable benefits for statistical training, the STI is one of many training centers for public officials in Korea. Each of the central and local government bodies maintains their own training centers. In addition, officials of Statistics Korea are allowed to take 518 designated courses. Among them, 159 courses are operated by STI, and 359 courses are offered by other training centers and/or universities. Therefore, the STI must compete to attract government officials to statistics which is generally accepted as 'difficult' and 'boring'.

Furthermore, training activities of STI are evaluated by four major types of indicators, which include results of training activities, financial performance, institutional management, and BSC performance. Despite continuous discussion and efforts to increase the validity and reliability of evaluation indicators, satisfaction score of trainees, job application, number of trainees, and income and expenditures are the current major indicators. Thus, this paper intends to examine the scores of major evaluation indicators by learning type, that is, traditional classroom learning and e-learning (cyber-leaning). In the previous papers presented at the 2010 and 2012 HRMT workshops (Park, 2010; 2012), training programs of STI were introduced by learning type and STI's plan to adopt u-learning was introduced. In this paper, the results of training activities by learning type will be discussed, and then our future plan will be introduced.

All programs are classified by two learning types: traditional classroom learning, and e-learning (cyber-learning). Traditional classroom learning can be combined with various types of learning utilizing ICT, action learning, role play, etc. They are classified as traditional classroom learning, if the classroom learning is the major tool. On the other hand, diverse terms are used interchangeably, and sometimes confusingly, for the computer and network-enabled transfer of knowledge and learning. In this paper, E-learning indicates internet-based learning or web-based learning. In cases where mobile technologies are used, the term 'M-Learning" is more common. The term "U-Learning" (ubiquitous learning) is used wherever and whenever learning is possible, regardless of the various digital devices being employed. E-learning using a PC or mobile device can be incorporated into a U-learning system. If learners use mobile devices only not PCs, U-learning is the same with M-learning. Although the term 'e-learning" is widely used than cyber-learning, the term "e-learning (cyber-learning)" will be used to distinguish between e-learning and u-learning in this paper.

<Figure1> Definition of terms for e-learning (cyber learning)

E-learning **M-Learning** **U-learning**

II. Results of Training Activities

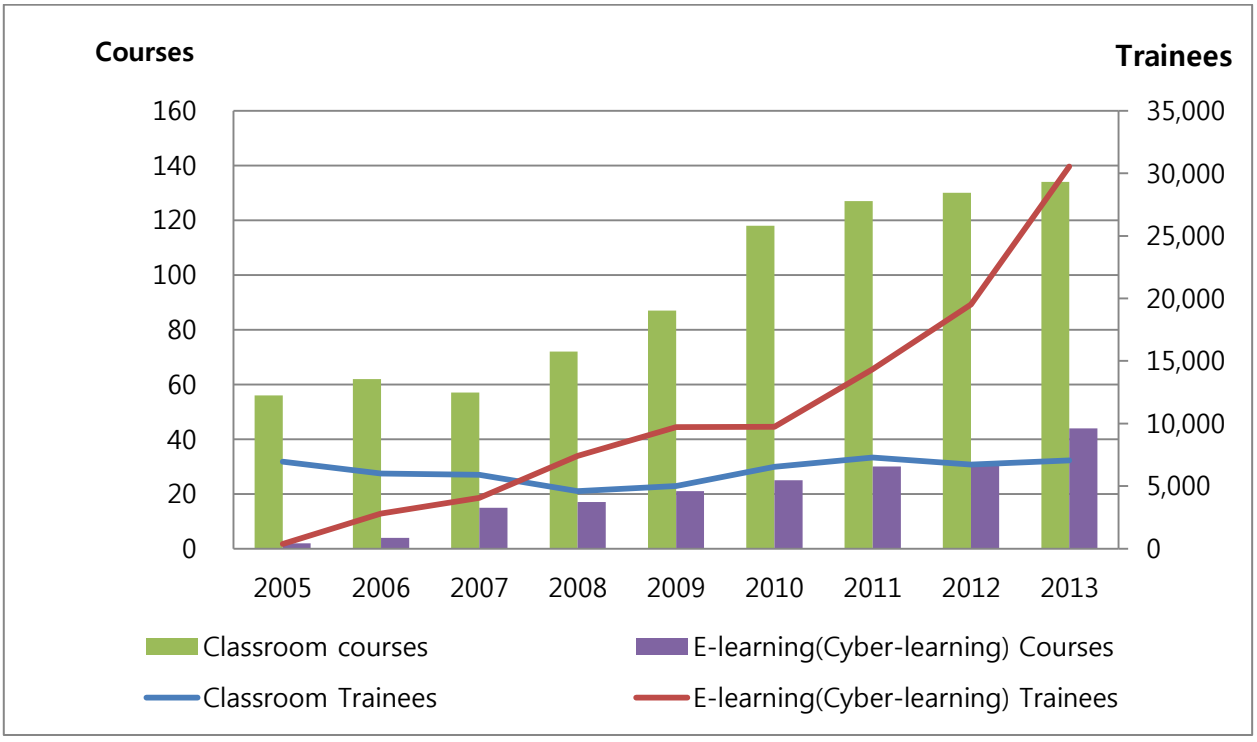
1. Number of Trainees by Learning Type

The E-learning program began in 2005 with two courses and 378 certified trainees, outnumbered classroom trainees since 2008, and continuously has expanded into 44 courses and 30529 trainees in 2013. U-learning was operated for the first time in 2013 with 11 courses and 10925 trainees <Table 1 and Figure 2>. Considering the proportion of e-learning (cyber-learning) among the number of trainees, it is evident that e-learning (cyber-learning) will be the dominant learning method in the future. As u-learning was introduced in 2013, the speed of its growth is not clear. However, its potential to grow seems to be very high as the satisfaction scores were higher for u-learning than for e-learning and u-learning was used regardless of the age of the users.

<Table 1> Number of courses and trainees by learning type

Learning Type		2010(A)		2013(B)		Difference(B-A)	
		Courses	Trainees	Courses	Trainees	Courses	Trainees
Total		143	16278	178	37580	35	21302
Classroom learning		113	6535	134	7051	21	516
e-learning (cyber)	e-learning	30	9743	33	19604	3	9861
	u-learning	-	-	11	10925	11	10925

<Figure 2> Numbers of Courses and Trainees by Learning Type

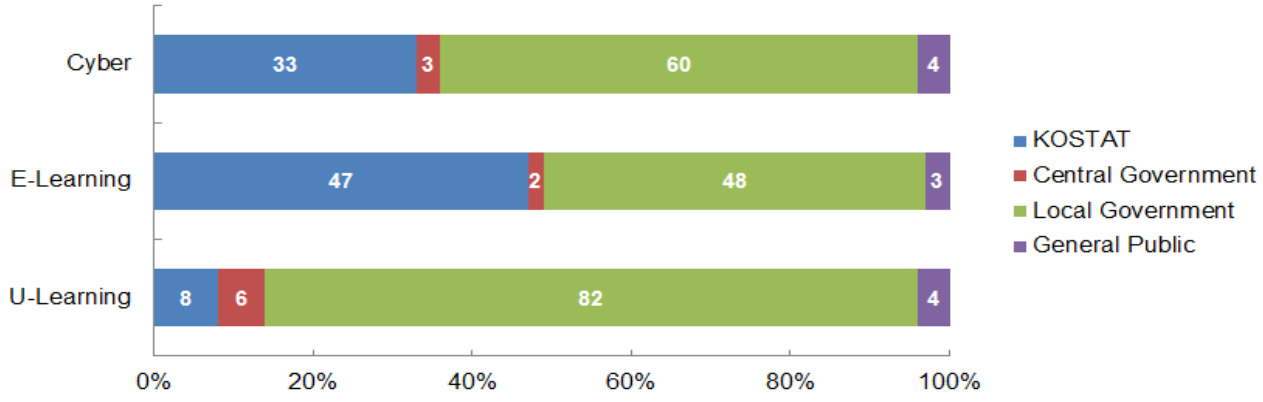


Major e-learning trainees are officials of local governments and KOSTAT staff of regional statistical offices in 2013<Table 2 and Figure 3>. For u-learning only, 82% of all u-learning trainees are officials of local governments. The popularity of u-learning among local government officials was mostly due to the contents of u-learning. Eleven courses were uploaded in 2013: Leadership for Personal Capacity, Leadership Development, Problem Solving Ability, Psychology of Persuasion, Tips for Work-life, Survey Methodology, Regional Policy and Statistics Utilization, Understanding Statistics, Self-Improvement, Negotiation Skills, and Statistical Analysis Using SPSS. Among the 11 courses uploaded, the course "Regional Policy and Statistics Utilization" draws wide interest from the local government. The other reason for the popularity among local governments was that statistical training was one of the indicators by which local governments were evaluated. This policy has drawn many busy officials of local governments to u-learning.

<Table 2> Number and proportion of e-learning trainees by agency, 2013

	Total	KOSTAT (Head-quarter)	KOSTAT (Regional Statistical Office)	Central Government	Local Governments	General Public (Private Institutions)
Cyber	30529 (100%)	319 (1%)	9,770 (32%)	1,002 (3%)	18,405 (60%)	1,033 (4%)
E-learning	19,604 (100%)	157 (1%)	8,966 (46%)	393 (2%)	9,487 (48%)	601 (3%)
U-learning	10,925 (100%)	162 (1%)	804 (7%)	609 (6%)	8,918 (82%)	432 (4%)

<Figure 3> Proportion of trainees by learning type



2. Cost of Training by Learning Type

E-learning is well known for its cost-effectiveness and it is widely used in the private business sector for its monetary productivity. As presented in <Table 3>, the total expenditure spent by the STI in 2013 was more than twice for classroom learning than for e-learning. The annual variation of total spending occurs due to the particular investment such as text development for classroom learning and content development for e-learning. In short, extra investment was made for e-leaning in 2013 so that the expenditure for 2013 e-leaning would be higher than for other years.

<Table 3> Cost of training by learning type, 2013

(Unit: Person, KRW in thousands)

Learning Type	Total Expenditure	For Lecturer	Text Purchase	Package Lease	Contents Development.	Per Trainee
Total	617,479	453,692	84,055	60,187	262,211	16
Classroom Learning	599,419 (100%)	435,632* (73%)	84,055 (14%)	60,187 (10%)	-	85
E-learning (Cyber)	280,271 (100%)	18,060 (6%)	-	-	262,211 (94%)	9**

Notes:

(1) * Excludes payments for in-house lecturer

(2) ** Number of total e-learning trainees includes u-learning trainees. As the same content of e-learning is used for u-learning, the actual cost of u-learning is zero. If the number for u-learning is excluded and pure e-learning is considered, the expenditure per trainee increases from 9 to 14.

(3) As all components of expenditures are not presented in this table, the sum of the components does not match with the total expenditure.

In 2013, 97 percent of the total expenditure for training management was used for classroom learning. Among the expenditure for classroom learning, 73 percent of the total was used for lecturers, 14 percent for paper text purchasing, and 10 percent for the lease of statistical packages. That is, most of the training expenditures were paid for lecturers. For e-learning, however, 94 percent of e-learning expenditures were used for contents development. For lecturers, classroom learning was more than 24 times than that of e-learning. The total expenditure per trainee was KRW 9,000 for e-learning and KRW 85,000 for classroom learning. Despite yearly variations of expenditures by learning type, the overall expenditure per trainee for classroom learning was more than 9 times higher than e-learning in both 2011 and 2013 (Park, 2012).

The long term professional classroom courses were the most expensive courses as they were planned to nurture core specialists for KOSTAT. In order to train specialists, STI spent an average of KRW 1110,000 per trainee, and at least KRW 4997,000 for one A-grade qualified staff in 2013 <Table 4 and Figure 4>. Training one A-grade expert costs more than 60 times than training regular all classroom courses. Considering that the expenditure does not include text purchases, travel fees, and work lost, the cost to foster a specialist is tremendous.

<Table 4> Cost of training per trainee for the long term professional classroom courses, 2013

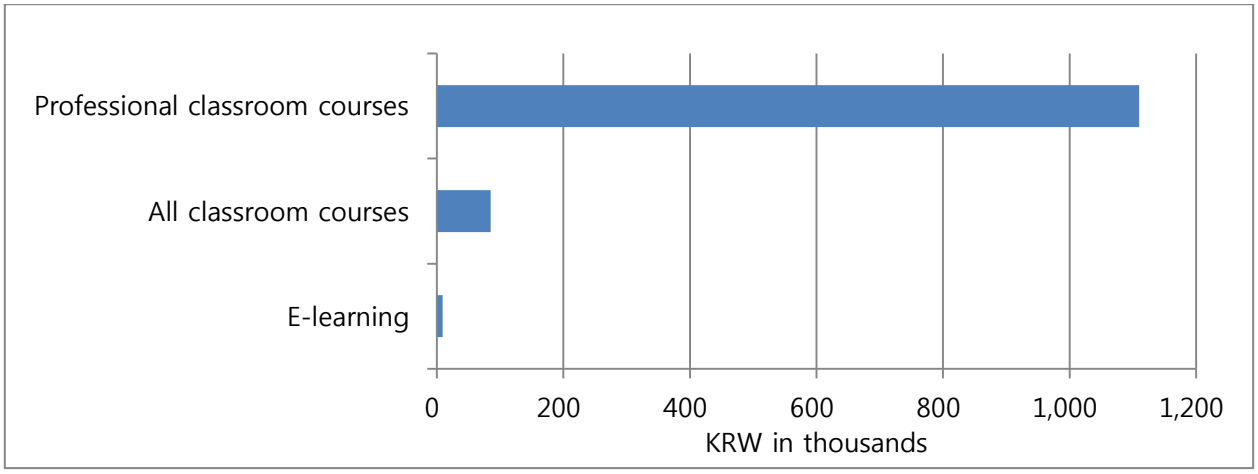
(Unit: Weeks, Person, KRW in Thousand)

Courses	Term Weeks (hours)	Total Trainees (Completed)	# of Trainees with Grade A	Total Expenditure	Exp. per hour	Exp. per trainee	Exp. Per A-grade Trainee
Sampling	19(57)	5(5)	0	10471	184	2094	10471*
Population Projection	17(51)	5(5)	1	9312	183	1862	9312
SNA	15(45)	9(8)	1	4094	91	455	4094
Index Theory	13(39)	5(5)	2	3940	101	788	1970
Survey Planning	10 (30)	5(4)	1	6360	212	1272	6360
Non-response	9 (27)	7(7)	3	5799	215	828	1933
Average	14(42)	6(6)	1.3	6663	161	1110	4997

Note: 1) Total expenditure includes fees paid for teaching and evaluation only.

2) * Assumed one A-grade holder.

<Figure 4> Cost of training per trainee by learning type



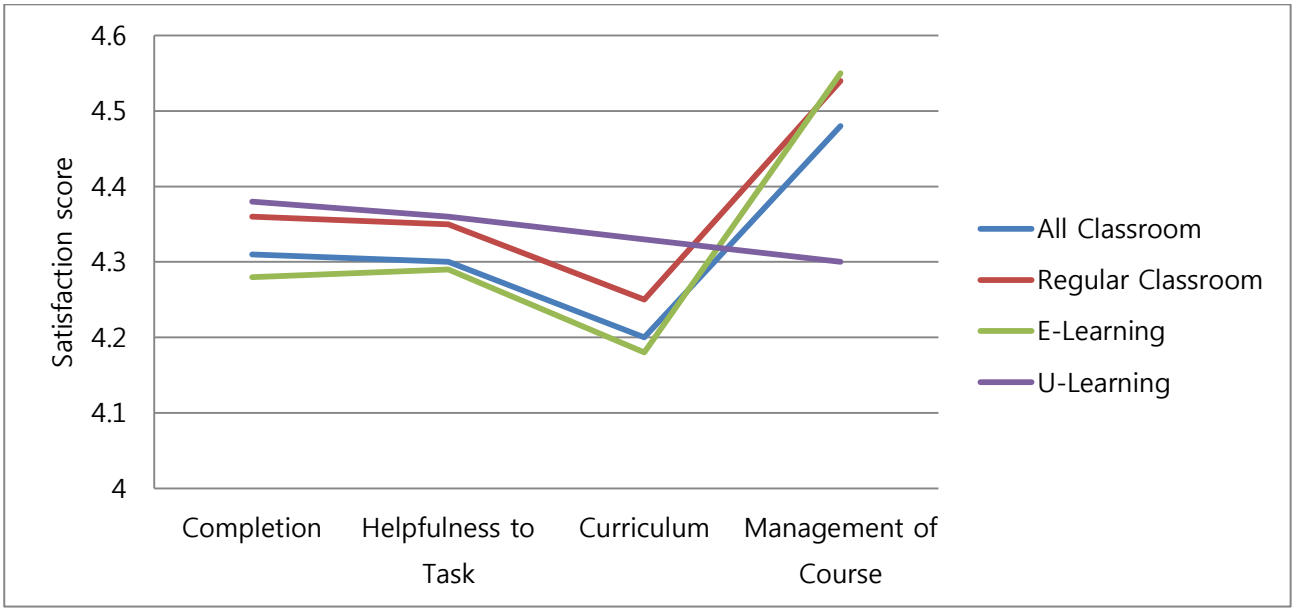
3. Satisfaction Scores by Learning Type

After the completion of classes, all trainees are subject to finish an evaluation survey which measures satisfaction level by a five point scale. As summarized in <Table 5 and Figure 5>, u-learning showed the highest scores for all sub-dimensions except in management. Satisfaction of management was highest for e-learning and lowest for u-learning. The satisfaction score of management was the lowest for u-learning, because it was started for the first time in 2013, and expertise of u-learning management was not cumulated. In other dimensions such as overall completion, helpfulness to tasks, and curriculum, u-learning showed the highest score and e-learning the lowest. Among classroom courses, regular courses showed higher scores than all regular and frequent ad hoc courses.

<Table 5> Satisfaction scores of all classes by learning type, 2013

Learning Type	# of Courses	AVG	Completion	Help. To Task	Curriculum	Management Of Course
All Classroom	134	4.31	4.31	4.30	4.20	4.48
Regular Classroom	64	4.37	4.36	4.35	4.25	4.54
E-Learning	33	4.40	4.28	4.29	4.18	4.55
U-Learning	11	4.34	4.38	4.36	4.33	4.30

<Figure 5> Satisfaction scores of all classes by learning type, 2013

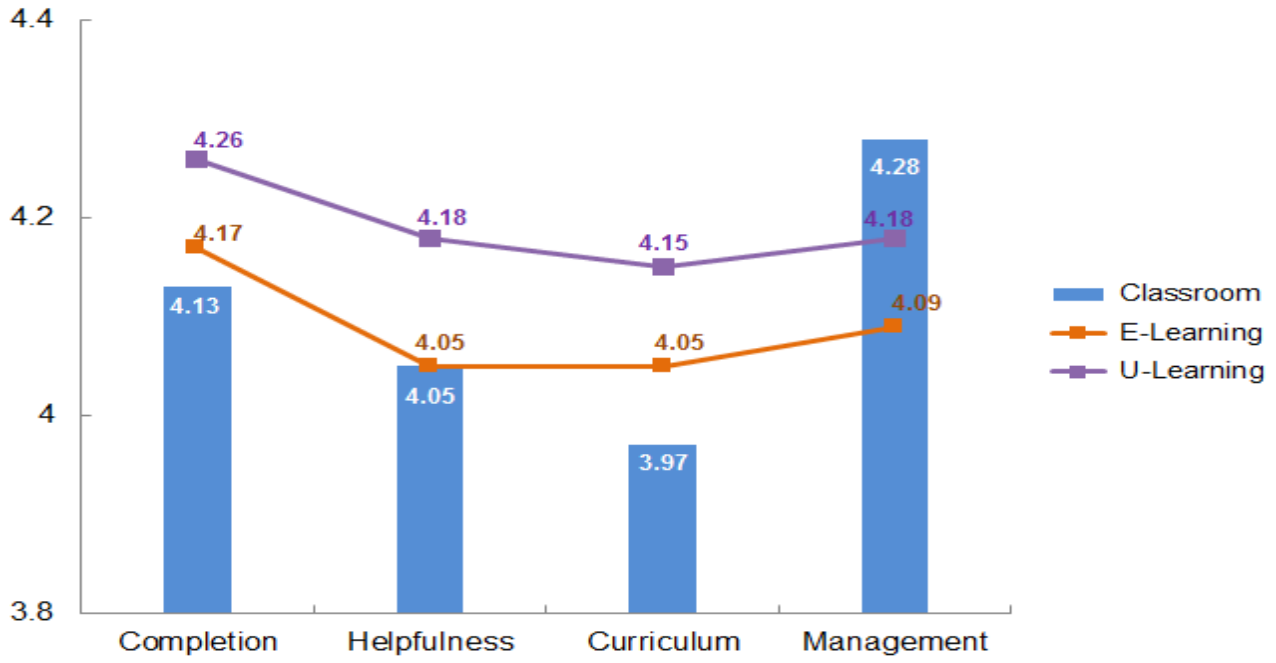


In order to compare learning type effects more accurately, the overall satisfaction score was compared for the course, Regional Policy and Statistics Utilization. U-learning showed the highest for these three dimensions, and classroom learning showed the lowest, except for management of the course <Table 6 and Figure 6>. In every dimension of satisfaction, u-learning showed a higher score than e-learning. For management, classroom learning showed the highest. For the same course, E-learning was operated nine times for 1,878 trainees, while u-learning was operated 12 times for 2636 trainees, and 17 hours of classroom learning were conducted twice for 74 trainees.

<Table 6> Satisfaction scores by learning type for the course
"Regional Policy and Statistics Utilization" in 2013

	# of Trainees	Average	Completion	Helpfulness to Task	Curriculum	Management of course
Classroom	74	4.11	4.13	4.05	3.97	4.28
E-learning	1878	4.09	4.17	4.05	4.05	4.09
U-learning	2636	4.19	4.26	4.18	4.15	4.18

<Figure 6> Satisfaction scores by learning type for the course "Regional Policy and Statistics Utilization" in 2013



4. Satisfaction Scores of the Professional Classroom Courses

STI started the long-term professional courses in 2010 to foster statistical core expertise for KOSTAT. Overall satisfaction scores for six long-term professional courses are almost the same with all regular and frequent ad hoc classroom courses (134) with an average of 4.30. Again, professional classroom courses also showed the highest scores for the management of courses<Figure 8>. Overall, satisfaction with curriculum was the lowest in all courses except for Population Projection..

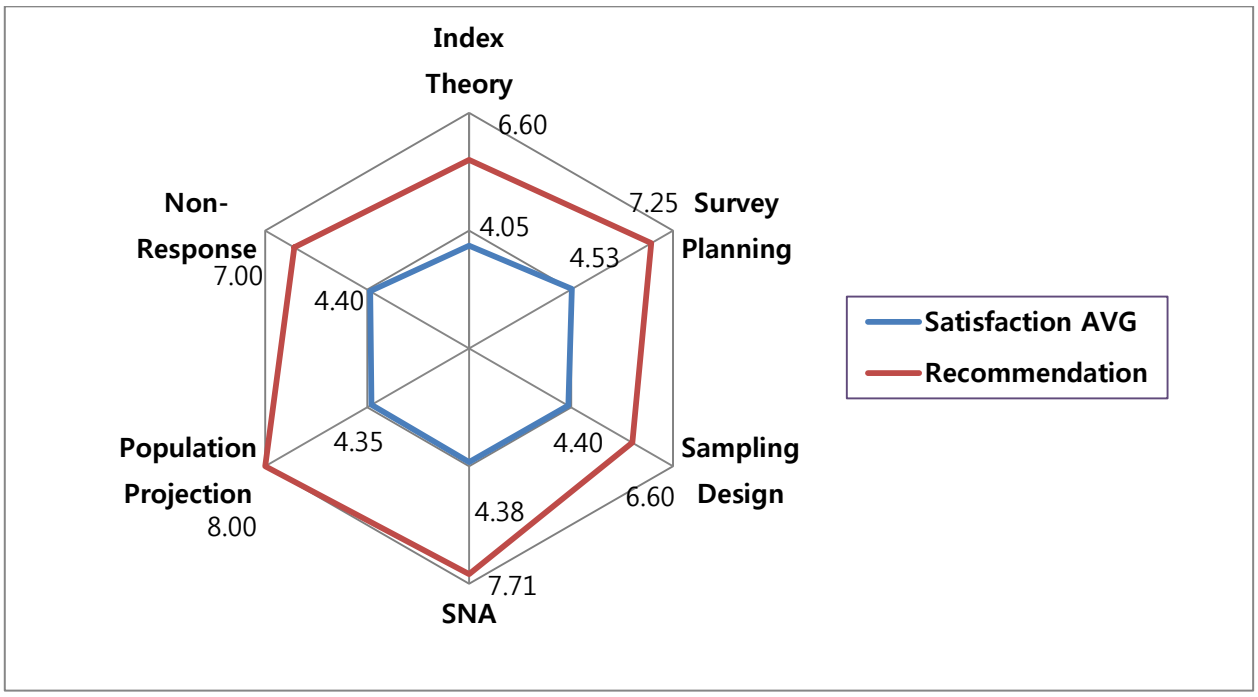
As overall satisfaction scores reached the highest level, they were not so meaningful for the evaluation of training activities. Therefore, STI introduced a new indicator called "Recommendation Rate" measured by the question, "Would you recommend this course to your colleagues?" Based on this question, recommendation rates were calculated. Again, the Index Theory showed the lowest score in both indicators <Table 7 and Figure 7>. Sampling Design also showed the lowest recommendation rate. As a whole, the recommendation rate does not show a similar pattern with the overall satisfaction scores. For example, survey planning showed the highest satisfaction score, but Population Projection showed the highest recommendation rate.

<Table 7> Satisfaction scores and recommendation rate for the long-term professional classroom Courses*, 2013

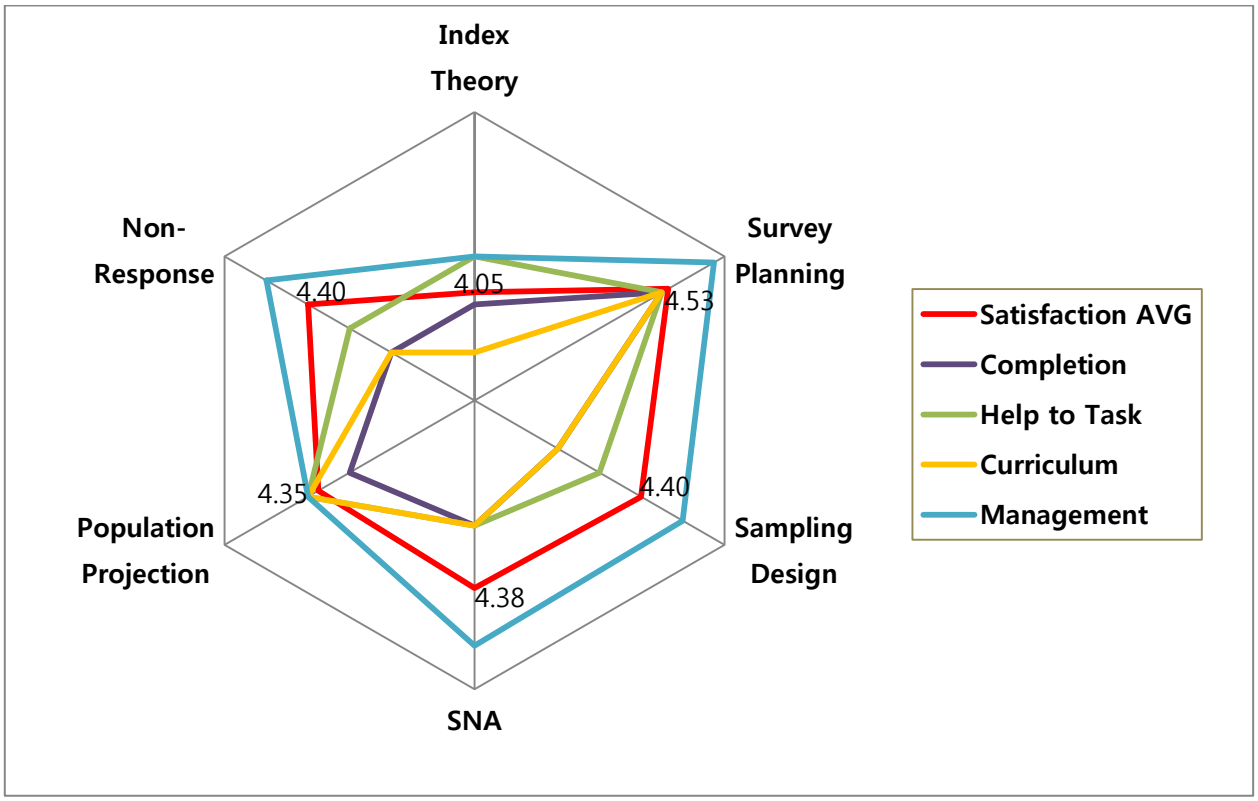
	AVG	Index Theory	Survey Planning	Sampling Design	SNA	Population Projection	Non-Response
Satisfaction AVG	4.30	4.05	4.53	4.40	4.38	4.35	4.40
-Completion	4.14	4.00	4.50	4.00	4.12	4.20	4.00
- Help to Task	4.25	4.20	4.50	4.20	4.12	4.40	4.20
- Curriculum	4.08	3.80	4.50	4.00	4.12	4.40	4.00
- Management	4.44	4.20	4.75	4.60	4.62	4.40	4.60
Recommendation	7.19	6.60	7.25	6.60	7.71	8.00	7.00

* Satisfaction is measured by a 5 point scale and recommendation is measured by a 10 point scale.

<Figure 7> Satisfaction scores and recommendation rate for the long-term professional classroom courses, 2013



<Figure 8> Sub-dimensional satisfaction scores for the long-term professional classroom courses, 2013



5. Task Relevancy and Job Application

Survey on task relevancy and job application was conducted for 64 regular classroom courses for the reference period of July 1, 2013 - June 30, 2014 during July14-August 14, 2014. The complete internet survey was conducted for the KOSTAT staff through intranet, and the sample survey was conducted through emails and face to face follow-ups for the 180 external agencies of central government, local government, and private institutions. The response rate was 85.8% for KOSTAT (65.6% for headquarter and 96.7% of regional offices) and 100% for external agencies<Table 8>.

<Table 8> Background of respondents and response rates

KOSTAT (Complete Survey)				External Agencies (Sample Survey)		
Type	Respondents	Response rate	Target	Type	Respondents	Target
Total	1188 (100%)	85.8	1384	Total	180 (100%)	180
Headquarter	316 (26.6%)	65.6	482	Central Gov.	57 (31.7%)	57
Regional Office	872 (73.4%)	96.7	902	Local Gov.	65 (36.1%)	65
				Private	58 (32.2%)	58

The overall task relevancy (3.64) of professional classroom courses was higher than all regular classroom courses (3.58), but their job applicability was the same with 3.84 for both professional and regular courses<Table 9>. Furthermore, task relevancy and job applicability showed quite interesting results as presented in <Table 9 and Figure 9>: (1) Survey Planning was attended by the staff of regional offices and their job relevancy and applicability were not so high; (2) Non-response Analysis was almost meaningless for both headquarters and regional offices; (3) Sampling Design was meaningful for the staff of headquarters but not for the staff of regional offices; (4) Index Theory was relevant but not applicable to the job; (5) Population Projection was not relevant but applicable; and (6) National Accounts showed the highest relevancy and applicability.

As presented in <Table 10>, task relevancy and job application of classroom courses were different by the trainee's motivation of taking courses. Both task relevancy and job applicability were the highest for those who took courses out of need for tasks at work, followed by "individual competency development" and "100 hours learning requirement". This motivation effect was significant especially for the long-term professional classroom courses.

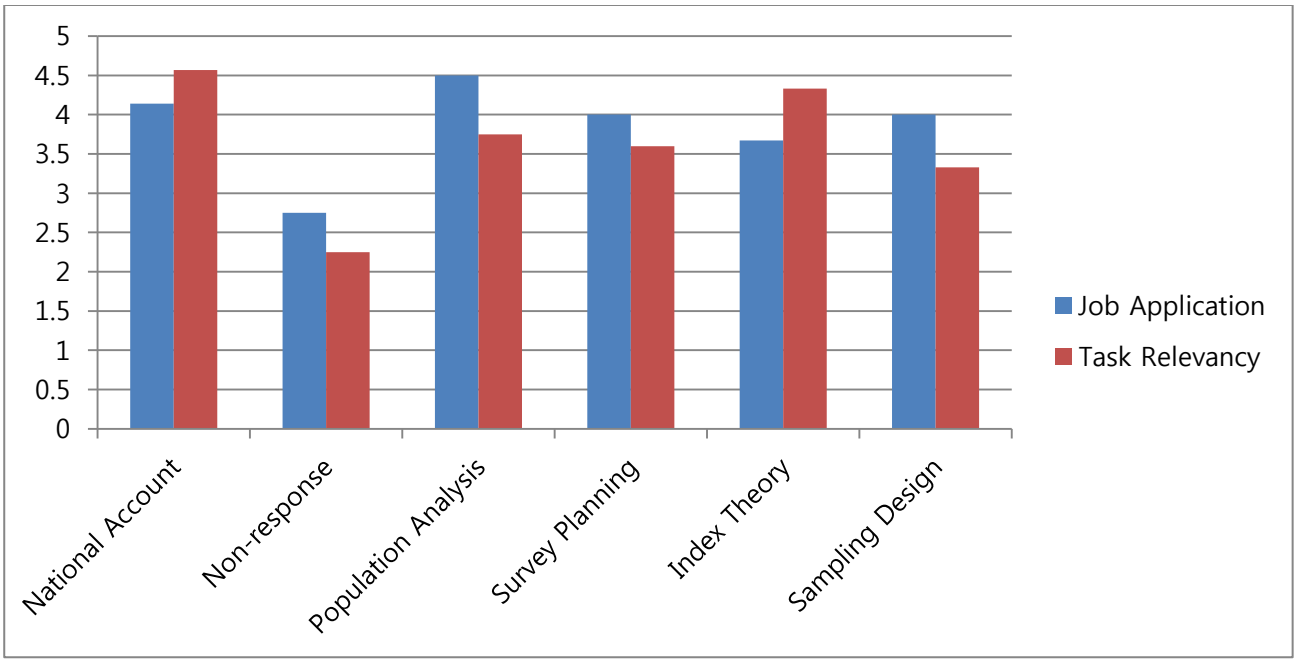
STI started a long-term professional course in 2010. During 2010-2013, STI operated 26 courses for 172 trainees. Among 172 trainees, 8 trainees dropped the courses and 164 trainees completed the courses with the completion rate of 95 percent. Among trainees, 21% were dual applicants and graduates. That is, trainees who completed one professional course took another professional course. The proportion of dual graduates seems to be a good sign of the usefulness of courses. Out of 164 completed trainees, 36 trainees (20.9 percent) obtained an A-grade as a certified expert. Out of 36 certified professionals, four trainees (A-Grade holders) were appointed as a specialist and an

additional five trainees (B-Grade holders) were appointed as a specialist with higher salary in five areas (economic statistics, sampling, population projection, survey planning, and SNA). About twenty percent of experts were taken by certified graduates of STI's professional courses.

<Table 9> Task relevancy and job application for all regular courses and long-term professional classroom courses, 2013

Courses	Task Relevancy			Job Application			Respondents		
	Total	Headquarter	RO	Total	Headquarter	RO	Total	Headquarter	RO
Regular Courses	3.58	3.64	3.56	3.84	3.78	3.86	1188	316	872
Professional Average	3.64	3.86	2.20	3.84	3.96	3.00	4.5	3.3	0.8
National Account	4.57	4.57	-	4.14	4.14	-	7	7	-
Non-response	2.25	2.67	1.00	2.75	3.00	2.00	4	3	1
Population Analysis	3.75	3.75	-	4.50	4.50	-	4	4	-
Survey Planning	3.60	-	3.60	4.00	-	4.00	6	-	6
Index Theory	4.33	4.33	-	3.67	3.67	-	3	3	-
Sampling Design	3.33	4.00	2.00	4.00	4.50	3.00	3	2	1

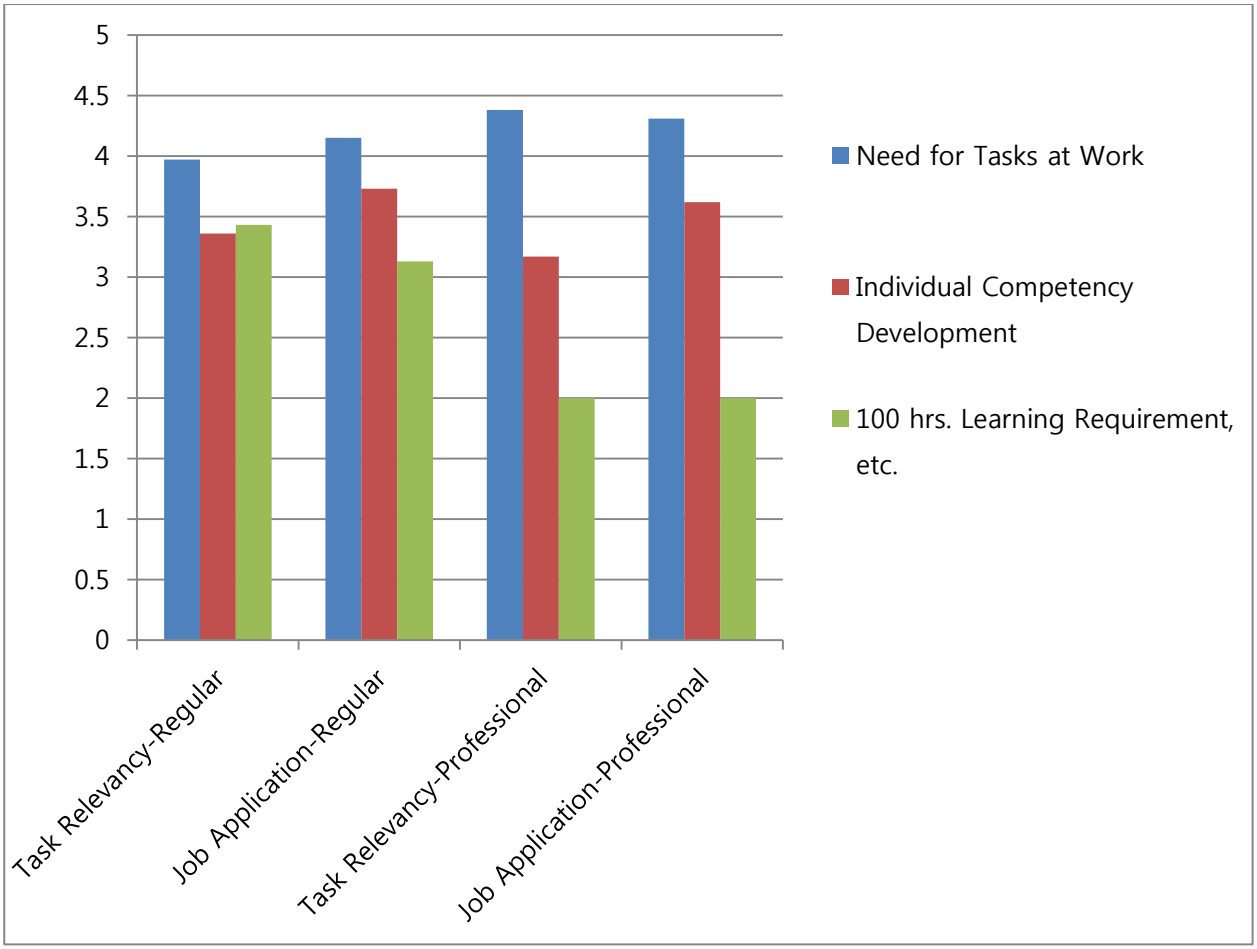
<Figure 9>Task relevancy and job application for long-term professional classroom courses, 2013



<Table 10> Task relevancy and job application by the motivation of taking courses for all regular courses and long-term professional classroom courses, 2013

Motivation for Taking Courses	All Regular Courses		Six Professional Courses	
	Task Relevancy	Job Application	Task Relevancy	Job Application
Need for Tasks at Work	3.97	4.15	4.38	4.31
Individual Competency Development	3.36	3.73	3.17	3.62
100 hrs. Learning Requirement, etc.	3.43	3.13	2.00	2.00
Total	3.58	3.84	3.64	3.84

<Figure 10> Task relevancy and job application by the motivation of taking courses for all regular courses and long-term professional classroom courses, 2013



III. Summary and Conclusions

The evaluation results of training activities of STI can be briefly summarized as follows:

a. Cyber-learning (e-learning + u-learning) grows very rapidly.
b. U-learning was most popular among officials of local governments.
c. Classroom learning was an expensive learning method, recording at least a 9 times higher cost per trainee for all classroom courses than e-learning.
d. U-learning showed the highest satisfaction scores and e-learning the lowest satisfaction scores for all sub-dimensions (completion, helpfulness to tasks, curriculum) except for the management of course.
e. Classroom learning showed the highest satisfaction score for the management of course.
f. Regular classroom courses showed higher satisfaction scores than all regular and frequent ad hoc classroom courses.
g. Overall satisfaction scores and recommendation rates measure different aspects of learning and training.
h. Task relevancy of the most expensive long-term professional classroom learning was higher than that of all regular classroom courses.
i. Job application of the most expensive long-term professional classroom learning was the same with job applicability of all regular classroom courses.
j. Task relevancy and job application was the highest for trainees who took the course out of "needs for tasks at work", followed by "individual competency development" and "100 hours learning requirement".

The goal of STI is to contribute to the national statistical advancement and the happiness of Koreans by nurturing statistical human capital and changing the public's view on statistics. For the realization of the above outcomes, STI will continue to expand e-learning and u-learning. Classroom lectures have some constraints of venues and lecturers, whereas e-learning doesn't have such restrictions. Accordingly, e-learning shows a steady increase and it seems to be continued. Past trend of e-learning has been moved from PC-based to mobile-based. With the development of technology, ubiquitous learning will be realized in the near future, which will enable people to be networked anywhere and anytime.

STI will restructure traditional classroom learning courses for more advanced contents in order to reflect the changing job competency requirements. Staffs of KOSTAT headquarters and other public and private entities demand new courses. They include big data analysis, data linkages, and administrative data analysis along with the advancement of information technology. As classroom learning is very expensive, blended (cyber + classroom) learning needs to be utilized for the effectiveness of classroom learning.

Most of all, the motivation of individual learner is very important. So, HRMT systems should make efforts to maximize motivations of individuals to increase organizational performance. To achieve this, the training system and the HR system should be more harmonized for the creation and transference of knowledge for the organizational performance.

Training results of STI cannot be perfectly measured by satisfaction scores, task relevancy, job application, and the recommendation rate. As training courses are open to all by individual choices, the trainees demand easier fun-oriented courses. As STI is evaluated mainly by satisfaction scores of trainees, STI as a training provider depends more on managing classes to obtain high scores rather than the training contents itself. For the advancement of organizational performance and individual capacity building, training providers should try to make a balance between the needs of organizational performance and the needs of individual customers. In order to raise the impact of training activities, STI will continue to focus on the quality and contents of all courses, whether it is e-learning or classroom learning by implementing STI's mid-term development plan.

References

Park, K. A., 2012, "E-learning programs of STI: Achievements and challenges," Paper presented at the 2012 Workshop on Human Resources Management and Training in Statistical Offices, Organized by UNECE, held at Budapest, Hungary.
http://www.unece.org/stats/documents/2012.09.hrm.htm.

Park, K. A., 2010, "Training programs for statistical competency development in STI of Korea," Paper presented at the 2010 Workshop on Human Resources Management and Training in Statistical Offices, Organized by UNECE, held at the UN headquarter of Geneva, Switzerland.
http://www.unece.org/stats/documents/2010.09.hrm.htm.

Appendix

STI Mid-term Development Plan
2013 Annual Programs of STI