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A Study on Trend of the Research Papers Published in the Journal of the Ergonomics Society of Korea

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ABSTRACT

Objective: The aim of this study is to investigate the attributing factors influencing major research areas of the papers published in the journal of Ergonomics Society of Korea (JESK). **Background:** Ergonomics has a wide range of research areas. Diversity of research topic is one of the major strong points of this discipline especially in the era of fusion. Dominant areas among the diversity changed from time to time. It is interesting to know the attributing factors of the dominant areas. **Method:** During the past three decades JESK has published 649 articles. As an editor of the JESK, I reviewed these papers and sorted them into the detailed research fields of ergonomics; (1) technical group (TG) s of the Human Factors and Ergonomics Society (HFES), (2) editing groups of the journal of Ergonomics Abstracts and (3) TGs of the Ergonomics Society of Korea (ESK). I also listed major events which might affect the publication trend. **Results:** Anthropometry was the most dominant area all the time. Health and safety area has been steadily increasing publication amount. **Conclusion:** Government research funding was the main attributing factor determining the publication trend of the JESK. **Application:** The results of the publishing trend analysis might help to determine the editing policy of the JESK.

Keywords: Trend analysis, Publication, Research papers, Journal of the Ergonomics Society of Korea

1. Introduction

Since the JESK, one of the most active centrum of the Korean ergonomists' idea was launched; it has grown quantitatively as well as qualitatively in publication activities. Not only the number but also the research fields have become diversified in the papers published in the journal. Although we use the same term ergonomics it has very diversified scientific roots in its detail such as anthropometry, psychology, work physiology, computer science, work measurement, and etc. and application areas such as consumer products, transportation, health and safety, individual difference just to name a few (Salas, 2008).

Some researchers classified the ergonomics papers published in the journals and proceedings into the detailed disciplines of ergonomics.

Zavod and Hitt (2000) examined the content of each article published in the journal Human Factors during 1988~1997 for subsequent classification within TGs of HFES.

Hitt (2000) reviewed the publishing trends in the HFES proceedings of the year 1988~1997. He also used 20 TGs from which each presentation paper is assigned as a classification method.

Lee (2000) grouped the ergonomics papers published in the journals and proceedings into (1) anthropometry and physical and physiological characteristics of human, (2) human performance, (3) industrial design, (4) manual materials handling and safety, (5) human computer interactions, (6) sensibility engineering, (7) aviation safety, (8) design of medical devices, and (9) aging.

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Lee (2010) tried to associate the underlying factors of the trend of the papers published in the JESK with the composition of ESK members.

This paper examined the research papers published in the JESK to find the dominant research fields and attributing factors affecting the publication trend.

2. Method

JESK published 649 articles during the year 1982 to 2009. The author examined each article and coded along 5 dimensions, which included:

(1) Year of publication: 1982~2009,

(2) Period of publication: 1980s (1982~1989), 1990s (1990~1999), and 2000s (2000~2009) with historical events occurred during each period

(3) Classification method 1: TGs of the HFES (Table 1)

(4) Classification method 2: the journal Ergonomics Abstracts' classification method (Table 1)

(5) Classification method 3: TGs of the ESK also used as a conference session grouping by the ESK (Table 1)

The author assigned each article by three different classification methods: TG of the HFES (classification method 1), a grouping method for editing the journal Ergonomics Abstracts, and the online database serviced by Ergonomic Information Center and Taylor & Francis co. (classification method 2), and TG of the ESK listing for proceedings presentations (classification method 3). Assignment of each article to certain categories was made by mainly key words and context of abstracts. However it

Table 1. Three classification methods by which articles were assigned

Classification method 1	Classification method 2	Classification method 3
Accidents, Safety, and Human Error	Display and Control Design	Biomechanics
Aerospace Systems	Environment	Cognitive science
Aging	General Ergonomics	Design ergonomics
Attentional Processes	Health and Safety	Human-computer interface
Automation and Expert Systems	Human Characteristics	Industrial application
Biomechanics, Anthropometry and Work Physiology	Information Presentation and Communication	Industrial safety
Cognitive Processes	Methods and Techniques	Living and environmental ergonomics
Communication Systems	Performance Related Factors	Muscular-skeletal disorder prevention
Computer Systems	Social and Economic Impact of the System	Potpourri
Consumer Products and Tools	System Characteristics	Sensibility engineering
Displays and Controls	Work Design and Organisation	Universal design
Health and Medical Systems; Patient Safety	Workplace and Equipment Design	Usability evaluation
Individual Differences		
Macro ergonomics and the Environment		
Manufacturing and Process Control Systems		
Naturalistic Decision Making		
Psychological States		
Psychomotor Processes		
Sensation and Perception		
Simulation and Virtual Reality		
Situation Awareness		
Surface Transportation Systems		
Training, Education, and Instructional Systems		
Visual Systems		
Work System and Workload Analysis		

should be understood that these categories are mostly intertwined with other categories and an article can stretch over multiple categories. Therefore the assignment results can be different if it is seen in the different viewpoint (Lee, 2000).

3. Results

Some descriptive statistics along the above 5 dimensions reflected the change of the ergonomics research activities of Korea during the past three decades.

3.1 Year of publication

In the first year the JESK published 12 articles. In 2009 the JESK published 47 articles, showing annual average growth rate of 11 percent (Figure 1).

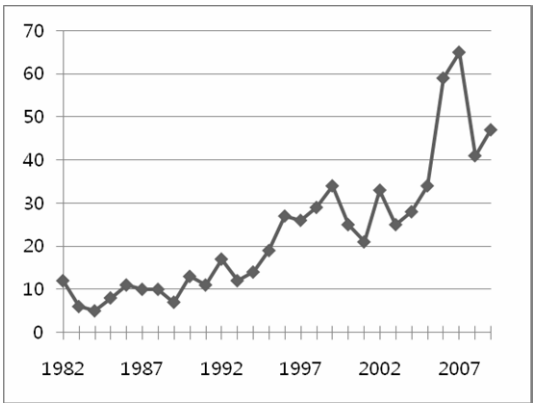

Figure 1. The annual numbers of papers published in the JESK.

3.2 Period of publication

We called the period of 1980s as the infant period of ergonomics (Lee et al., 2003). The ESK was established in 1982 by K. Park and his colleagues. Researchers working with industrial engineering, garments, or industrial design departments of universities published most of papers. The JESK published a total of 69 articles in this period (Figure 2).

We called the period of 1990s as the period of growth and maturity (Lee et al., 2003). Korean government initiated a nationwide project named sensibility engineering under the title of G7 project from the year 1995. This government funding boosted to increase the numbers of members of ESK as well as the papers published in JESK in the late 1990s (Figure 1). In 1998 ESK started to hold the ergonomics design award completion. The JESK published 202 articles in this period (Figure 2).

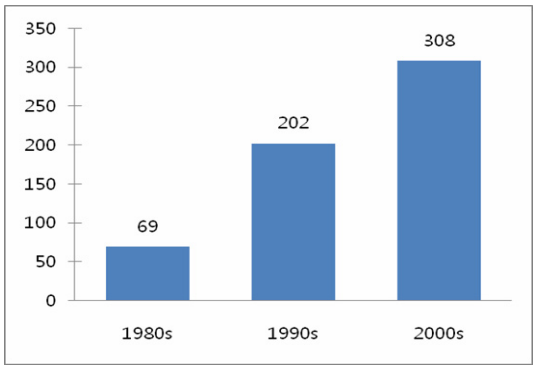

Figure 2. The number of papers published in three periods.

We called the period of 2000s as the period of take off (Lee et al., 2003). This turned out to be real in the late 2000s at least in terms of the number of papers published in the JESK (Figure 1). In 2003 ESK hosted the 15th world congress of International Ergonomics Association (IEA). In the same year ESK for the first time took charge of managing a nationwide anthropometry project under the title "Size Korea". In the period of 2000s the JESK published 308 articles (Figure 2).

3.3 Classification method 1

The author assigned each article to 25 categories, the latest TGs of HFES (Table 1). It was found that biomechanics, anthropometry and work physiology accounted for the highest amount publication activities over the 1980s (41% of the total). Displays and controls and work system and workload analysis groups were tied for second in hierarchy with 12 percent of the total followed by accidents, safety, and human error group (9%), automation and expert systems group (7%), and consumer product and tools group (7%) (Figure 3).

The ranking of biomechanics, anthropometry and work physiology group (42%) and Displays and controls group (9%) did not changed during the 1990s. Accidents, safety,

and human error group stepped up with 8 percent of the total and new groups such as sensation and perception group (8%), health and medical systems, patient safety group (6%) emerged as an above 5% group (Figure 4). The ranking of sensation and perception group is partially due to boost of research funding from the government driven project of sensibility engineering.

Figure 3 to 5 showed that the steady best ranking of publication trend of the JESK is on the biomechanics, anthropometry and work physiology group (25%) over three decades. Consumer products and tools group reentered for second ranking (15%). The health and medical systems, patient safety group (11%) steadily raising its rank as a major area of publication in ergonomics was followed by work system and workload analysis group (9%) and displays and controls group (9%). The displays and controls group known as traditional application area of ergonomics steadily reduced its relative position in publication trend of the JESK over the three decades.

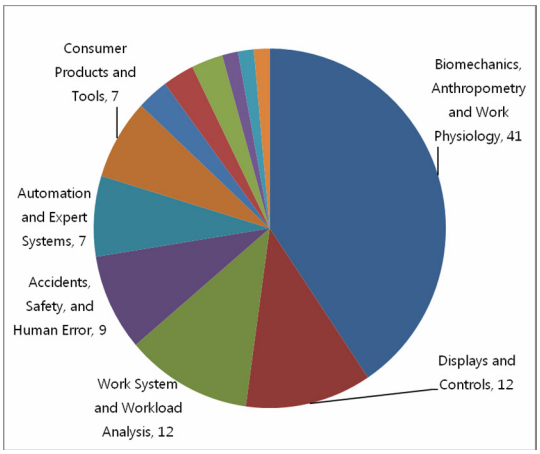

Figure 3. Major publication area of the JESK during 1980s (classification method 1).

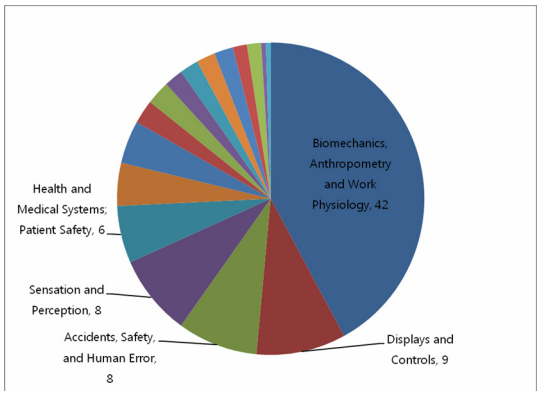

Figure 4. Major publication area of the JESK during 1990s (classification method 1).

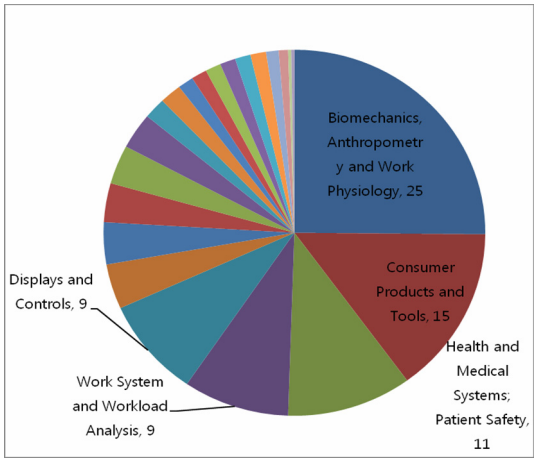

Figure 5. Major publication area of the JESK during 2000s (classification method 1).

3.4 Classification method 2

The Ergonomic Information Center has successfully serviced the abstracts excerpted from almost all kind of ergonomics related literatures with its own classification method (Table 1) quite different from TGs of HFES. This study repeated the assign task using this classification method 2 to get a different view about publication trend of the JESK.

Over the three decades the articles related human characteristics were placed top (Figure 6 to 8). The health and safety area has steadily increased its rank to be the second place in the 2000s. Although lowering their ranks, methods and techniques area and display and control design area are still placed as main areas of publication trend of the JESK.

3.5 Classification method 3

The ESK has its own TGs also used as categories to which presentations of proceeding papers are assigned (Table 1). Some critics pointed out the current TGs of ESK conference session might not be suitable for classification of submitted proceeding papers. The author repeated the

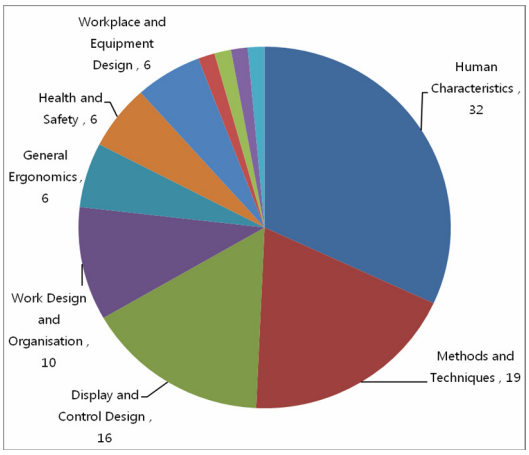

Figure 6. Major publication area of the JESK during 1980s (classification method 2).

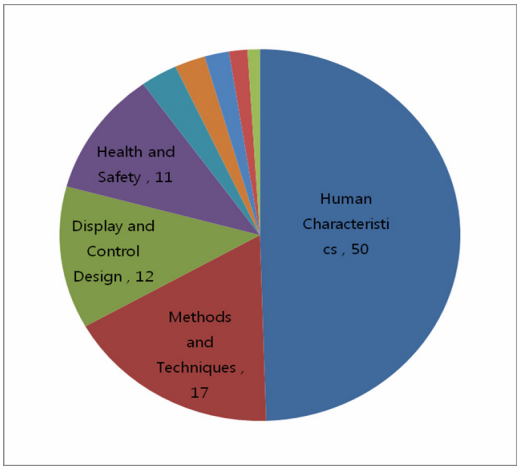

Figure 7. Major publication area of the JESK during 1990s (classification method 2).

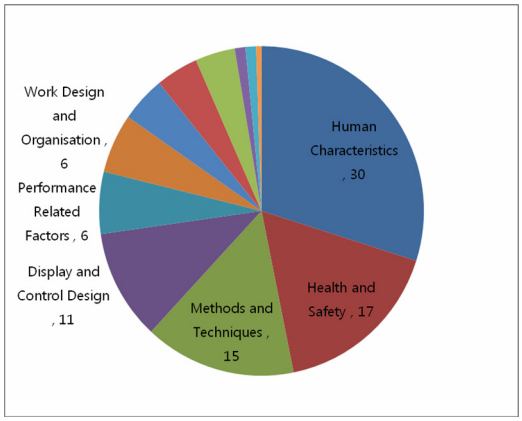

Figure 8. Major publication area of the JESK during 2000s (classification method 2).

assignment task using the ESK TGs-biomechanics, cognitive science, design ergonomics, human-computer interface, industrial application, industrial safety, living and environmental ergonomics, muscular-skeletal disorder prevention, potpourri, sensibility engineering, universal design, and usability evaluation. If it is difficult to assign a study the specific area, I assigned it to other area and called it potpourri likewise Lee (2000) did.

The top proposition of potpourri all over the three decades (Figure 9 to 11) means that a lot of articles were not easy to be assigned to proper areas of the current TGs of the ESK, implying unsuitability to cover the publication trend of the JESK.

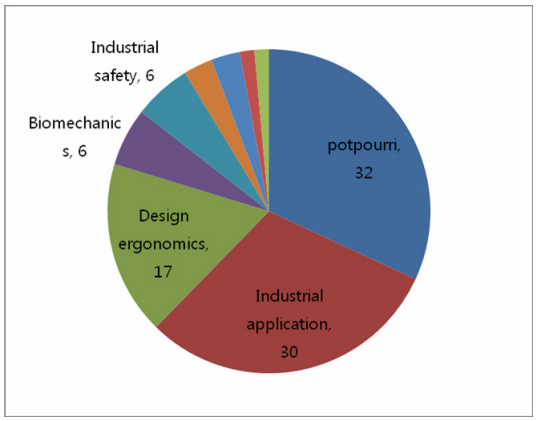

Figure 9. Major publication area of the JESK during 1980s (classification method 3).

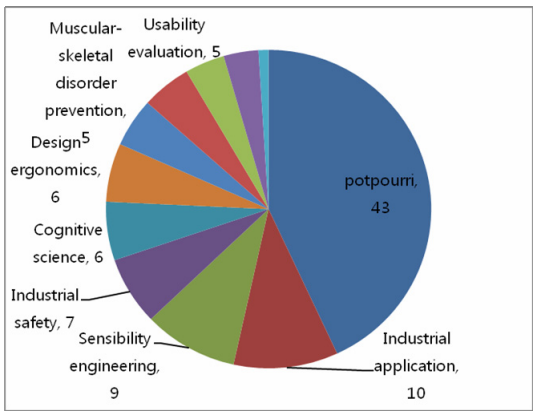

Figure 10. Major publication area of the JESK during 1990s (classification method 3).

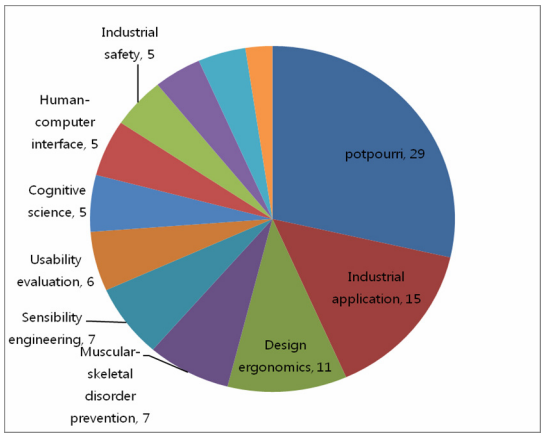

Figure 11. Major publication area of the JESK during 2000s (classification method 3).

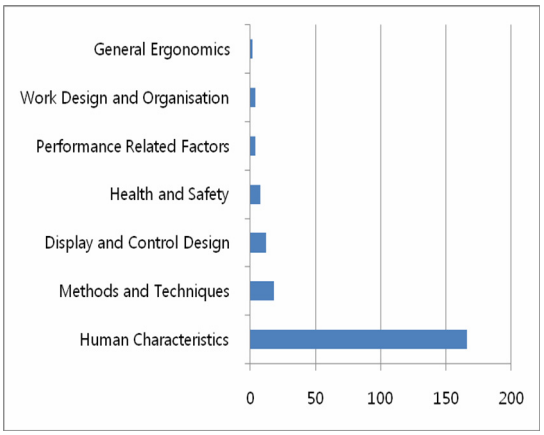

Figure 13. Reclassification of the articles which were classified as potpourri by classification method 2.

4. Concluding remarks

Detailed analysis showed that most of the 217 articles classified as potpourri (classification method 3) belonged to either biomechanics, anthropometry and work physiology area (classification method 1) (Figure 12) or human characteristics (classification method 2) (Figure 13). This implies that the current TGs of ESK lack of anthropometry, work physiology or human characteristics area while researches on those areas have been performed very actively.

Publication trend of a research journal cannot be free from governmental research funding. The descriptive statistics on the JESK publication data showed this simple principle. The top rank of the anthropometry area all over the three decades has been mainly due to the cyclical government driven nationwide anthropometry survey with 5-year period. The rising rank of sensibility engineering area (Figure 4) reflected the inflow of research fund from the government driven G7 project in 1990s.

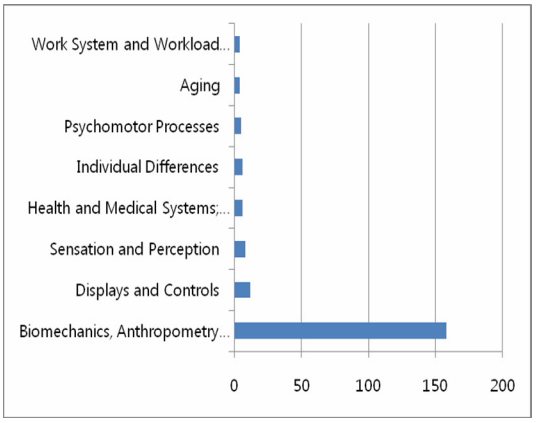

Figure 12. Reclassification of the articles which were classified as potpourri by classification method 1.

After governmental research funding, a technology innovation has a major role in determining the publication trend of the JESK. The advent of information and communication technologies has pushed up the researchers to publish a lot of articles on consumer products based on these technologies including cell phone during the 2000s period (Figure 5).

One interesting and remarkable point is a publication trend in health and safety area. As mentioned earlier the rank of this area has steadily risen all over the periods (Figure 3 to 8). The researchers with a major of heath science such as rehabilitation medicine have joined the ESK and actively published papers on work physiology and human characteristics.

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