Abstract

**Purpose:** The cabin crew’s in-flight work consists of safety and security-related tasks and requires specialized knowledge. With the popularization of air travel, the importance of safety-related work for cabin crew is becoming more and more important. Therefore, it is time to consider the work of cabin crew from a safety-oriented point of view and study to clarify the duties of cabin crew. The purpose of this study is to examine the effect of cabin crew knowledge pursuance on work self-efficacy and safety orientation, and the effect of cabin crew job regulation on work self-efficacy and safety orientation. The mediating effect of work self-efficacy is also verified.

**Method:** The questionnaire, targeting Korean staff working as flight attendant in domestic and overseas airline companies, has been carried out for this study, and on-line questionnaire has been processed as to maximize their participation. In this study, the hypothesis was verified through a structural equation model using 22 observational variables and 4 latent variables whose reliability and validity were confirmed through the evaluation of the measurement.

**Results:** First, both knowledge pursuance and job regulation have a significant effect on the work self-efficacy of airline cabin crew. Second, knowledge pursuance had a significant effect on safety orientation, but job regulation had no significant effect on safety orientation. Third, work self-efficacy has a significant effect on safety orientation. Fourth, work self-efficacy is partially mediated in the relationship between knowledge pursuance and safety-orientation of airline cabin crew. Fifth, work self-efficacy is completely mediated in the relationship between job regulation and safety orientation of airline cabin crew, and the mediating effect is statistically significant.

**Conclusion:** Cabin crew’s efforts to continuously acquire and maintain professional knowledge on the overall safety of aircraft and safety for each aircraft type are important factors that enable the professionalism of the cabin crew. Safety knowledge and safety motivation play an important role as antecedent variables for carrying out safety behaviors consisting of safety compliance and safety participation. Proposals for various programs that allow indirect experience of safety-related situations include in-house safety seminars, easy-to-use VR-based safety accident and incident case, and constructive individual feedback. This training method will provide an opportunity for cabin crew to gain confidence in their ability to respond well to a variety of safety-related accidents and accidents based on their aviation-related safety knowledge.

**Keywords:** Safety Orientation, Knowledge Pursuance, Job Regulation, Work Self-Efficacy, Cabin Crew

1. Introduction

Air travel has the characteristics of a public good as a means of public transportation and a catalyst for social and cultural exchange[1]. The safe operation of aircraft is not only the key to the sustainable growth of aviation management, but also very important to the well-being of the people at the national level. Accordingly, the ministry of land, infrastructure and transport(MLIT) conducts an intensive
inspection of the safety systems of airports and airlines. At the same time, the MLIT strives to ensure comfortable travel for air travelers by suppressing the possibility of aircraft accidents in advance and raising the safety awareness of aviation workers. However, despite the efforts of government departments, large and small aviation accidents have been occurring steadily. As international flights resumed after nearly two years of suspension due to COVID-19, cabin crew are doing their best to ensure safe flight through recurrent training. Therefore, it is necessary to focus on the human factor as an effort to prevent aviation accidents at this point when international flights are in full swing.

The causes of aviation accidents can be divided into hardware and software factors, and as revealed in the recurrence inspection of aviation accidents, human factors, which are software factors, account for a large portion[2]. The International Civil Aviation Organization(ICAO) and the airline business manual specify that a cabin crew member is “a person who boards an aircraft and evacuates passengers quickly and safely in case of an emergency, who normally performs in-flight safety and service tasks”[3]. describe the in-flight duties of cabin crew by dividing them into safety, security, and passenger service. As such, safety is the most important and top priority among cabin crew’s duties.

As the COVID-19 situation subsides and consumer sentiment for air travel rises, some domestic low-cost airlines are expanding and diversifying the mid- to long-distance route market by introducing mid- to large-sized aircraft. The main task of cabin crew is safety, and safety-related certificates and experience are preferred. Practical uniforms and sneakers that focus on cabin crew safety mean that the airline defines the role of cabin crew members as fulfilling their safety obligations. Although the need for research on cabin crew safety work is sufficient, existing cabin crew related research is focused on service-related fields. Therefore, this study focused on the antecedent variables for cabin crew to recognize the importance of safety and safely perform flight tasks for every flight. Based on previous studies[4][5][6][7], knowledge pursuance and job regulation were selected as antecedent variables that could affect the safety orientation of cabin crew. Knowledge pursuance refers to the attitude that cabin crew strives to continuously improve their knowledge and skills on safety in order to maintain their knowledge of aviation safety. Job regulation means that airline maintains cabin crew positions in compliance with the provisions set out in aviation law and international civil aviation regulations.

Recently, research on self-efficacy, a sub-concept of psychological capital based on positive psychological status, has been actively conducted. Previous studies on the effect of self-efficacy on service orientation and customer satisfaction are results related to cabin crew’s work, but empirical studies on the effect on the safety-oriented job attitude of cabin crew have not been well conducted[8][9]. Therefore, in this study, the effects of important knowledge pursuance variables from the viewpoint of cabin crew's individual attitude and important job regulation variables from the structural perspective of cabin crew duties were examined on safety orientation. In addition, the effect of the work self-efficacy and safety orientation of cabin crew and the mediating effect of work self-efficacy are investigated. The purpose of this study is to derive human utilization measures for safe operation of aircraft, which are essential for sustainable growth of airlines.

2. Theoretical Background

2.1. Cabin crew’s knowledge pursuance, job regulation and work self-efficacy

Cabin crew are employees who perform safety tasks and in-flight services at the point of contact with passengers, and play a role in helping passengers arrive at their destination safely and comfortably. The position and safety duties assigned to each cabin crew are finally decided through a pre-flight briefing according to the aircraft type, route, and number of crew members. Cabin crews acquire knowledge through manuals produced in accordance with the aviation law and ICAO, and maintain an attitude to pursue aviation-related knowledge in order to maintain a safe cabin environment. The cabin crew can increase their work self-efficacy through the qualifications they have completed through regular training, which increases the confidence that they can do safety-related tasks well for every flight[10][11][12][13].
H1: Knowledge Pursuance of cabin crew will have a significant positive(+) effect on work self-efficacy.
H2: Job regulation of cabin crew will have a significant positive(+) effect on work self-efficacy.

2.2. Cabin crew's knowledge pursuance, job regulations and safety orientation

Cabin crews are responsible for the safety of tens of thousands of passengers each year, and the safety orientation of cabin crew is paramount to both airlines and passengers[14][15][16][17]. Cabin crew must continuously maintain their knowledge of safety work to take responsibility for the safety of passengers, and can only perform their duties by taking and passing safety-related tests. Since this process will have a significant impact on the maintenance of safety orientation of cabin crew, hypotheses are established as follows.

H3: Knowledge pursuance of cabin crew will have a significant positive(+) effect on safety orientation.
H4: The job regulation of cabin crew will have a significant positive(+) effect on safety orientation.

2.3. Work self-efficacy and safety orientation of cabin crew

As competition in the aviation industry intensifies, airlines are making efforts to devise service-oriented practical measures through intensive safety education and briefings for cabin crew before and after flight in order to maintain safe flight[14]. However, the cabin crew's safety-oriented job attitude for passengers may be in conflict with service-oriented behavior for passengers. Therefore, in order to fully understand the two concepts of safety and service, it is important for cabin crew to have the confidence to do well in safety-related tasks. Therefore, it can be inferred that the individual variable of self-efficacy is a very important intrinsic motivating factor for cabin crew who have to perform various and detailed cabin crew duties. Based on previous studies[18][19][20][21], it can be inferred that self-efficacy affects performance variables when cabin crew is in charge of safety tasks.

H5: The work self-efficacy of cabin crew will have a significant positive(+) effect on safety orientation.

2.4. Mediating effect of work self-efficacy

As previous studies revealed[10][12][22][23][24], Self-efficacy is a cause variable that affects the organization’s positive performance. According to a study on safety accidents among domestic adolescents, groups with low safety efficacy did not take measures to prevent recurrence after safety accidents than high groups, and groups with high safety efficacy tended to be careful and cautious[25]. Accordingly, the self-efficacy of the cabin crew's job plays a mediating role in the relationship that the attitude level knowledge seeking variable for the pursuit of safety knowledge and skills and the variable securing qualifications by completing regular safety education will affect the safety orientation.

H6: The work self-efficacy of cabin crew will have a mediating effect in the relationship between knowledge pursuance and safety orientation.
H7: The work self-efficacy of cabin crew will have a mediating effect on the relationship between job regulation and safety orientation.

3. Survey Design and Survey Composition

3.1. Survey design

The population of this study was defined as Korean cabin crew working as cabin crew for domestic and foreign airlines. An online survey was conducted by combining the snowball sampling method and the judgment sampling method. 252 out of 384 initial samples were used for statistical analysis, excluding 132 responses from insincere respondents and non-regular flight attendants under two years.

3.2. Survey composition

The cabin crew's pursuit of knowledge was based on research by[4][6][7], and four questionnaires
were drawn to measure efforts to continuously pursue knowledge and skills in the job. The detailed measurement questions measured the importance and scope of airline cabin crew knowledge and skills, active learning attitudes, and the degree of steady effort to identify passenger propensity by country and route. It consists of a total of 4 questions, and a 5-point Likert scale was applied as the measurement standard.

Airline cabin crew work is carried out in accordance with ICAO regulations, and only those who have completed cabin crew training are eligible for judgment. Five items of belief in job regulation (identifying the ability to perform in-flight tasks among colleagues, identifying the actual work of colleagues, performing in-flight tasks, peer evaluation opportunities and peer performance assessment) were derived based on previous studies and a five-point Likert scale was applied to the measurement[4][6][7].

Work self-efficiency is defined as ‘personal belief and confidence in job performance ability as a flight attendant’. New general self-efficacy measurement question was applied[26]. A total of 8 questionnaire items (‘Possess sufficient ability to perform the job’, ‘No difficulties in performing the job’, ‘Sufficient qualifications to perform the job’, ‘Possess sufficient expertise’, ‘Confidence in one’s own superior abilities’, ‘Strong confidence in success through experience and performance’, ‘Able to handle more challenging tasks’, ‘Fits my expectations in my job’) were modified and supplemented to suit this study, and were measured on a Likert 5-point scale.

Safety orientation refers to the overall safety-oriented attitudes and actions taken by cabin crew for the safe operation of aircraft[27]. There are 7 detailed measurement items: ‘Safety check before every flight, actions taken by co-workers when safety checks are not performed, attention to abnormal situations, questions related to potential safety factors, confidence in one’s ability to evaluate safety-related tasks, thoroughly carry out safety work, and caution during critical flight stages.

3.3. Analysis method

This study used IBM SPSS 22.0 and AMOS 22.0 versions. The detailed analysis procedure is as follows. First, frequency analysis was performed to analyze the distribution of demographic characteristics and job-related characteristics. Second, reliability analysis was performed to confirm the reliability of the scale, and when the Cronbach’s coefficient exceeded 0.7, the reliability of the scale was evaluated as acceptable. Third, the measurement model was evaluated before constructing and analyzing the structural equation model. In the evaluation of the measurement model, the bias of the same method was confirmed by comparing the measurement model of the four constituent factors and the single factor model. A confirmatory factor analysis was performed to review the normality and evaluate the construct validity of the scale. Construct validity was calculated by calculating the Mean Variance Extraction (AVE) index and Synthetic Construct Reliability (CCR) proposed by[28]. If the AVE is 0.5 or more or the CCR is 0.7 or more, the concentrated validity is satisfied. And discriminant validity was evaluated when there was no correlation coefficient exceeding the square root of AVE in the correlation matrix between latent variables. Fourth, a structural equation model was built using a scale with reliability and validity, and the hypothesis was verified by evaluating the significance of the path coefficients set between each latent variable through maximum likelihood estimation. Fifth, the resampling method proposed by was implemented to analyze the mediating effect of job efficacy[29]. The statistical significance of the mediating effect on job efficacy was evaluated by calculating the standard error based on 1,000 resamples generated through bootstrap and bias correction at a 95% confidence interval.

4. Empirical Analysis

4.1. Demographic characteristics of the sample

A frequency analysis was conducted on the demographic and job-related characteristics of cabin crew members of airlines participating in this study. Among the 252 people who participated in this study, most airline cabin attendants were women (94.4%), and the age of the cabin crew was the most
in their 30s (61.1%). As for marital status, more than half were single (69.4%), and those with a bachelor’s degree (71.8%) had the most education.

The proportion of cabin crew members participating in this study were domestic airlines (49.2%) and foreign airlines (50.8%), and most of them were full-time employees (85.7%). More than half of the positions are economy class cabin crew (52.4%), and those with less than 5 years of aviation experience (53.6%) are the most frequent.

4.2. Measurement model evaluation

Confirmatory factor analysis was performed by designating a measurement model consisting of the first 25 observed variables and 4 latent variables. However, since one observational variable of job regulation (JR4) and work self-efficacy (SE2) inhibited one-dimensionality, these two items were removed and the measurement model was reconstructed. A measurement model consisting of 23 observed variables and 4 latent variables was used for all subsequent analyses.

To evaluate normality, the absolute values of skewness and kurtosis of the observed variables were checked. The absolute values of skewness ranged from a minimum of .006 to a maximum of .851, and in the case of kurtosis, a minimum of .033 and a maximum of 1.244. This was found to be much closer to the normal distribution than the level (skewness <3, kurtosis <10) suggested by [30].

In a cross-sectional study situation, the same method bias may occur when measuring by the self-report method using a measurement tool such as a questionnaire. In this study, the same method bias was diagnosed by comparing the theoretically constructed four-factor measurement model with the single-factor model that includes all observed variables in one latent variable. As a result, in the case of the 4-factor measurement model, all but the $\chi^2$-statistic were found to be at a suitable level $[\chi^2(203)=371.111(p<.001), \text{Normed}\chi^2=1.828, \text{RMSE}=910, \text{CFI}=921, \text{RMSEA}=0.57(\text{LO90}=.048/\text{HI90}=.067)]$, whereas the fitness indices of the measurement model consisting of a single factor mostly showed an unacceptable level $[\chi^2(209)=884.661(p<.001), \text{Normed}\chi^2=4.233, \text{RMSE}=909, \text{CFI}=681, \text{RMSEA}=1.13(\text{LO90}=.106/\text{HI90}=.121)]$. Therefore, it was judged that the bias of the same method was unlikely to distort the results of this study. Table 1 shows the results of analyzing the reliability and concentration validity of the scale for the 4-factor measurement model. As a result of the reliability analysis, high internal consistency was secured in knowledge pursuance (=.761), job regulation (=.754), work self-efficacy (=.895), and safety orientation (=.816).

As a result of the concentrated validity analysis, the standardized factor loads for the 22 observation variables used in this study ranged from a minimum of .572 to a maximum of .812, and all were statistically significant. In addition, knowledge pursuance (AVE=.703, CCR=.904), job regulation (AVE=.583, CCR=.848), work self-efficacy (AVE=.740, CCR=.952), safety orientation (AVE=.563, CCR=.899) met the Fornell and Larcker criteria (AVE>0.5, CCR>0.7) [28]. Therefore, it is judged that the 22 observation variables used in this study have sufficient convergent validity.

Table 1. Reliability and convergent validity test.

<table>
<thead>
<tr>
<th>LVs</th>
<th>OVs</th>
<th>SFLs</th>
<th>AVEs</th>
<th>CCRs</th>
<th>α</th>
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<tr>
<td>Knowledge pursuance</td>
<td>KP1</td>
<td>.572***</td>
<td>.703</td>
<td>.904</td>
<td>.761</td>
</tr>
<tr>
<td></td>
<td>KP2</td>
<td>.728***</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>KP3</td>
<td>.701***</td>
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<td></td>
<td>KP4</td>
<td>.658***</td>
<td></td>
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<tr>
<td>Job regulation</td>
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<td>.583</td>
<td>.848</td>
<td>.754</td>
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<tr>
<td></td>
<td>JR2</td>
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<td></td>
<td>JR3</td>
<td>.686***</td>
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<td>JR5</td>
<td>.722***</td>
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### 4.3. Structural equation model and hypothesis verification

The hypothesis was verified through a structural equation model using 22 observational variables and 4 latent variables whose reliability and validity were confirmed through the evaluation of the measurement. The hypothesis test results are shown in <Figure 1>. According to the goodness-of-fit index of the structural equation model, which is equivalent to the measurement model, the covariance matrix was evaluated as a suitable level for estimating the structural equation model in this study\(\chi^2(203)=371.111(p<.001)\), Normed\(\chi^2=1.828\), RMR=.027, TLI=.910, CFI=.921, RMSEA=.057(LO90=.048, HI90=.067).

As a result of hypothesis verification, the positive effect of knowledge pursuance on work self-efficacy(=.475) is statistically significant\(t=5.297, p<.001\). Hypothesis 1 was adopted. In addition, the positive effect of job regulation on work self-efficacy(=.283) was also found to be statistically significant. Hypothesis 2 was therefore also adopted. In addition, among the total variance of work self-efficacy, knowledge pursuance and job regulation explanatory power were 40.6%.

The effect on work self-efficacy was 0.192 higher in knowledge pursuance than job regulation. As a result of performing the \(\chi^2\) test on the difference between the two path coefficients, it was found that
Δχ² = 4.442. This exceeds the rejection range of 3.84 when the degree of freedom is 1 at the 5% significance level, and the effect on work self-efficacy is statistically higher in knowledge pursuance than job regulation.

As a result of hypothesis testing on the antecedent factors of safety orientation, the positive effect of knowledge pursuance on safety orientation directly (γ₁ = .385) was statistically significant (t = 3.783, p < .001). So hypothesis 3 was accepted. However, the positive effect of job regulation directly on safety orientation (γ₃ = -.090) did not reach a statistically significant level (t = -1.140, p > .05), so hypothesis 4 was rejected. The positive effect of work self-efficacy on safety orientation (β₅ = .417) was found to be statistically significant (t = 4.329, p < .001), so hypothesis 5 was accepted. Knowledge pursuance, job regulation, and work self-efficacy were found to explain 45.6% of the total variables of safety orientation.

Figure 1. Results of structural equation modeling.

<Figure 1> shows the results of analyzing the significance of the mediating effect of work self-efficacy in the relationship between knowledge pursuance and safety orientation, job regulation and safety orientation. Work self-efficacy plays a partial mediating role in the relationship between knowledge pursuance and safety orientation, and the mediating effect of work self-efficacy (.198) in this relationship is statistically significant (p < .01). The mediating effect of work self-efficacy in the relationship between knowledge pursuance and safety orientation did not include “0” in the 95% confidence interval. Therefore, hypothesis 6 was accepted.

Work self-efficacy plays a complete mediating role in the relationship between job regulation and safety orientation, and the mediating effect of work self-efficacy is at a statistically significant level (p < .01). The mediating effect of work self-efficacy in the relationship between job regulation and safety orientation did not include “0” in the 95% confidence interval. Therefore, hypothesis 7 was accepted.
Table 3. Mediation effects by work self-efficacy.

<table>
<thead>
<tr>
<th>Paths</th>
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<th>LO95</th>
<th>HI95</th>
<th>p-Values</th>
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<tbody>
<tr>
<td>KP → SO</td>
<td>.198</td>
<td>.110</td>
<td>.250</td>
<td>.001</td>
</tr>
<tr>
<td>JR → SO</td>
<td>.118</td>
<td>.048</td>
<td>.326</td>
<td>.001</td>
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Note: 1,000 of sub-samples were generated by bootstrapping, and then the biases were corrected in a 95% confidence interval.

5. Conclusion and Implications

Knowledge pursuance and job regulation variables were calculated as antecedent variables for airline cabin crew's safety orientation, and the relationship was investigated. Also, the mediating effect of work self-efficacy was verified.

The hypothesis test results are summarized as follows. First, as a result of examining the effects of knowledge pursuance and job regulation on the work self-efficacy of airline cabin crew, both variables have significant effects. Second, as a result of examining the effects of knowledge pursuance and job regulation of airline cabin crew on safety orientation, knowledge pursuance had a significant effect on safety orientation, but job regulation had no significant effect on safety orientation. Third, as a result of examining the effect of airline cabin crew’s work self-efficacy on safety orientation, work self-efficacy has a significant effect on safety orientation. Fourth, work self-efficacy is partially mediated in the relationship between knowledge pursuance and safety-orientation of airline cabin crew. Fifth, work self-efficacy is completely mediated in the relationship between job regulation and safety orientation of airline cabin crew, and the mediating effect is statistically significant.

As a result of this study, it was derived that the cabin crew’s efforts to continuously acquire and maintain professional knowledge on the overall safety of aircraft and safety for each aircraft type are important factors that enable the specialization of the cabin crew[4][31]. Also, derived that safety knowledge and safety motivation play an important role as antecedent variables for carrying out safety behaviors consisting of safety compliance and safety participation[32]. This study revealed that safety-related performance, as in the results of previous studies by[33][34]. Can indicate safety behavior only when training is accompanied by knowledge of safety[13][35]. In particular, it is important for cabin crew to be fully aware of safety tasks for each stage of flight(Briefing -> Pre-flight check -> Passenger boarding -> Door Closing and arming -> Aircraft push back -> Taxiing -> Take-off -> Cruise -> Descent -> Approach -> Landing -> Disarming and Door Opening -> Passenger disembark). When an abnormal situation occurs, it is important to prepare and handle it in advance so that the situation does not become an emergency situation(law, IATA). Cabin crew members must continuously maintain their knowledge of safety under job regulation for safety-related tasks. In particular, new safety-related regulations are introduced during a period of outbreak of diseases such as COVID-19, and these new regulations must be actively learned and applied immediately to in-flight situations.

As a result of examining the parameters of work self-efficacy in the relationship between knowledge pursuance and safety orientation of cabin crew, work self-efficacy was partially mediated. On the other hand, job efficacy was completely mediated in the relationship between the cabin crew's job regulation and safety orientation. It can be inferred that job training and evaluation should not be determined simply by written tests and oral tests when conducting essential safety education prescribed by the law for the safety-oriented attitude of cabin crew.

The following are ways to indirectly experience various situations related to aviation safety in order to pursue knowledge of cabin crew duties and increase work self-efficacy. This is to expand the existing one-sided regular safety training method to provide a forum for presentation and discussion in the form of in-house safety seminars. Through this, cabin crew can acquire safety-related knowledge on their own, thereby increasing their sense of self-efficacy for safety jobs and pursuing safety orientation. In addition, if cabin crew members can easily access VR-based aircraft safety accidents and incidents...
at any time and receive constructive feedback on safety-related tasks, cabin crew members are expected to increase self-efficacy and safety orientation. Such education will give cabin crew confidence that they can respond well to various safety accidents and incidents based on aviation-related safety knowledge. This seminar on safety-related tasks (research, presentation, discussion), easy-to-use VR-based safety accident and incident experience and constructive feedback will help airlines manage sustainably by establishing an organizational culture in which airlines value safety tasks. As in the results of previous study that self-efficacy has a significant positive (+) effect on attitude, it can be inferred that these institutional measures will help to maintain a safety-oriented attitude by increasing the work self-efficacy of cabin crew[36]. The academic significance of this study is that it attempted to apply a new variable called safety orientation, a safety-oriented job attitude of cabin crew, which has rarely been dealt with in the existing airline cabin crew human management research. However, it is still in its early stages as a study on the safety orientation of cabin crew. Therefore, it is necessary to develop clear theoretical concepts and measurement indicators for the safety orientation of cabin crew based on this study. Since job regulation affects safety orientation through work self-efficacy, it is necessary to expand research on the self-efficacy of cabin crew based on the results of this study. This study is meaningful in that it is an early study to secure aviation safety and has laid the foundation for active research on it.

6. References

6.1. Journal articles


6.2. Thesis degree


6.3. Books


7. Appendix

7.1. Author’s contribution

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<td>-Set of concepts ☑</td>
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<td>-Someone who can explain all aspects of the paper ☑</td>
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