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# TEACHERS' PERCEPTIONS OF COMPETENCE RELATED TO RUBRICS AND THE PROBLEMS THEY CONFRONT

*Research Article*

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**Abstract**

The purpose of this research is to determine the competencies and difficulties experienced by science teachers in developing, using, and scoring rubrics. For this purpose, the descriptive survey model was used in the research. This study was conducted with 71 science teachers working in 12 different provinces of Turkey. The availability sampling method was used to determine the sample of the study. A survey of 17 items developed by researchers was used to determine teachers' views on the rubric. Personal information and Likert-type questions in the survey were analyzed with descriptive statistics. As a result, it was found that the teachers felt partially adequate in preparing and applying rubric and scoring, and faced some difficulties in these processes. It was determined that most science teachers had difficulty in understanding explanations, deciding on the appropriate subject, deciding on the type of rubric to be used, and the criteria of performance to be measured when preparing the rubric. It was also revealed that the limited level of knowledge of most teachers about rubrics partly affected their practice with these tools. Finally, it was found that the teachers were always objective and tolerant when scoring with rubrics, never giving close scores without looking at performance, sometimes affecting the student's overall success in class and disciplinary behavior.

*Keywords:* Performance evaluation, rubric, science teacher, teacher efficacy.

## 1. Introduction

In today's world, rapid changes and transformations in technological, economic, social and cultural areas have caused the needs of societies to change. As a result of these changes and transformations, individuals are expected to have knowledge and skills in many fields. Therefore, the importance of education is increasing and education understanding is changing in parallel with the changing needs of society. Through education, the knowledge and skills needed by societies are transferred to individuals and it is aimed that individuals adapt to changing social dynamics.

It is aimed to educate individuals who can think critically and creatively, transfer the information they learn to daily life, make rational decisions and communicate effectively with their environment in today's educational understanding. To achieve this goal, countries regularly revise or modify their training programs. As a result of the changing understanding of education, education programs are organized in assessment and evaluation approaches as well as learning-teaching approaches. Because developments in the world show that traditional methods of assessment and evaluation are not sufficient to educate individuals in today's society and to determine their level of skills such as problem-solving, critical thinking, and creative thinking (Özenç & Çakır, 2015). Student-centered and performance-based assessments, which include products that reveal how students use their knowledge and skills, as well as the emergence processes of their product, reflect a new understanding. Rubrics are one of the most common measurement tools used for this purpose (Parlak & Doğan, 2014).

Rubrics are tools that contain criteria for performance to be measured and detailed descriptions of the quality of each criterion from good to bad (Goodrich, 1997; Andrea&Du, 2005). The performance observed with rubrics is recorded to the appropriate size among the criteria previously defined. Rubrics are extremely useful and practical tools that support learning and evaluation that reflect students' effort, knowledge, and skill, working habits and values in relation to constructivist performance (Brualdi, 1998). Rubrics, which can be found in many different forms and levels, can be used to evaluate many senior skills based on performance. It has found a use for itself due to dissatisfaction with performance-based assessments, especially teachers' projects, oral presentations (Reddy, 2007).

In changing assessment approaches, explicit articulation of assessment criteria is emphasized (O'Donovan, Price & Rust, 2004; Wingins, 1998). Rubrics, which offer clear criteria, help students learn about the standards they strive to achieve (McCollister, 2002). Learning goals with rubrics are presented openly to students and allow teachers to give detailed feedback to students. Thus, they serve as both a teaching and an assessment tool for the new understanding of assessment (Andrade, Du, &Wang, 2008). Rubrics, which provide detailed feedback, help students see weaknesses and strengths related to their performance by providing active participation in the evaluation process (Andrade, 2005). The use of these tools when evaluating fellow students from the other party promotes the development of peer evaluation skills (Panadero, Jonsson & Strijbos, 2016). Furthermore, the fact that the criteria are clear and well defined ensures that the performance evaluation process is transparent (Jonsson, 2014; Reddy, 2007; Venning and Buisman-Pijlman, 2013). At this point, these rubrics have a positive effect about the performance on both evaluator's being objective (Moskol, 2000; Moskal and Leydens, 2000; Reynolds, Smith, Moskovitz & Sayle, 2009) and consistent with each other (Venning and Buisman-Pijlman, 2013; Jonsson, 2014). In addition to all these, rubrics contribute to the development of self-efficacy (Andrade, Wang, Du, & Akawi, 2009; Panadero & Jonsson, 2013) and self-regulation (Panadero and Jonsson, 2013; Saddler & Andrade, 2004) skills that positively affect learning.

Teachers are expected to pay attention to measurement and evaluation methods that will provide performance-based assessments, to have knowledge of these methods, and to be willing to use these tools in and out of the classroom. However, studies show that teachers feel inadequate about the use of alternative assessment and evaluation tools (Bayat & Şentürk, 2015; Demir, 2015, Duran, Mıhladız & Ballıel, 2013; Güneş, Şener-Dilek, Hoplan, Celikoglu, and Demir, 2010; Özenç and Çakır, 2015). Besides, teachers' preparation of these tools (Metin and Özmen, 2010), implementation (Demir, 2015; Duban and Kucukyilmaz, 2008; Gomleksiz, Yıldırım, & Yetkiner, 2011; Tatar and Ören, 2009) and evaluation (Çetin, 2011; Gömleksiz et al., 2011) it was revealed that the subjects were being asked and wanted to be informed on these subjects (Metin and Özmen, 2010; Metin 2013). When the literature examined, it was observed that the studies in this subject were related to alternative assessment and evaluation techniques in general, the studies in which each instrument evaluated separately was limited. In particular, there have been very few studies on the level of knowledge of teachers about rubrics (Özdemir, 2010; Şenel, Pekdağ, Günaydin, 2018), their competence to prepare and implement these tools (Metin, 2010) and the difficulties they had in these processes. Therefore, it is deduced that determining the qualifications of teachers related to the rubric and the difficulties they had will contribute to the literature. Therefore, this study aims to determine the competencies and difficulties experienced by teachers in dealing with rubrics.

## 2. Method

### 2.1. Research Model

The descriptive survey model was used in this research as the research aims to determine the competencies and difficulties experienced by science teachers in developing, using, and scoring rubrics skills.

### 2.2. Sampling

This study took place in the 2016-2017 academic year. In 12 different provinces of Turkey (Aksaray, Ankara, Eskisehir, Karaman, Konya, Bilecik, Kocaeli, Şırnak, Van, Afyon, Isparta, Zonguldak), the study was conducted with 71 science teachers who had prior knowledge about rubrics. The availability sampling method was used to determine the sample. The demographic characteristics of the participants were presented in Table 1.

Table 1. *Demographics of participants*

| Gender | n | % | Education status | n | % |
|---|---|---|---|---|---|
| Woman | 37 | 52 | Undergraduate Education | 57 | 80 |
| Man | 34 | 48 | Postgraduate | 14 | 20 |
| Total | 71 | 100 | Total | 71 | 100 |
| Year of service | n | % | School type of graduation | | |
| 0-5 | 22 | 31 | Faculty of Education | 66 | 93 |
| 6-10 | 16 | 22 | Faculty of Science and Letters | 4 | 6 |
| 11-15 | 12 | 17 | Other | 1 | 1 |
| 16-20 | 12 | 17 | Total | 71 | 100 |
| Above 20 | 7 | 10 | | | |
| Those who didn't respond | 2 | 3 | | | |
| Total | 71 | 100 | | | |

When Table 1 was examined, it was observed that 37 (52%) of the participants were female and 34 (48%) were male teachers. Most of the participants (31%) have 0-5 years of service.

### 2.3. Data Collection Tool

The survey, developed by researchers, was used to determine teachers' views on the rubric.

*Teachers' opinion survey on the rubric:* A survey of 17 questions was developed to determine teachers' views on the rubric as a result of the literature survey. The first 9 questions of the survey were about teachers' demographic information (gender, years of service, field, education, getting lesson previously on assessment and evaluation, attending a training or a seminar about assessment and evaluation, type of the alma mater, etc.). Also in the survey, preparation of teacher rubrics, application and scoring to determine the views of 3 Likert type questions (12, 14, 15, 16), 2 questions that have multiple answers (11, 13), and 2 yes or no questions and in total there are 7 questions. Likert-type articles are rated as a triplet (12) and quintet (14, 15, 16). The survey was primarily applied to 94 science teachers. 23 of these teachers were excluded from the study because they stated that they did not have information about rubrics. The research was continued with 71 science teachers with knowledge of rubrics.

### 2. 4. Analysis of the Data

Personal information and Likert-type questions in the survey were analyzed with descriptive statistics.

## 3. Findings

This section includes findings on the competence of science teachers to develop, use and score rubric skills and the difficulties they experienced in these processes. In the study, the sources that science teachers were first informed of rubrics were presented (Table 2).

Table 2. *The resources that teachers are informed about rubric*

| Items | n | % | Items | n | % |
|---|---|---|---|---|---|
| From Curriculum | 33 | 46 | From Undergraduate education | 54 | 76 |
| From In-service training | 13 | 18 | From Seminars, conferences, etc. | 5 | 7 |
| From the internet | 16 | 22 | From pedagogical formation courses | 6 | 9 |
| From colleagues | 17 | 24 | Other | 4 | 6 |
| From textbooks | 24 | 39 | | | |

When Table 2 was examined, it was revealed that 76% of science teachers heard about rubric in undergraduate education for the first time. The qualifications of science teachers related to rubric were presented in Table 3.

Table 3. *Competencies of teachers on rubrics*

| Items | | n | % | | | n | % |
|---|---|---|---|---|---|---|---|
| Level of theoretical knowledge about rubrics | None | 0 | 0 | Level of preparation for rubric | None | 4 | 6 |
| | Lower | 6 | 8 | | Lower | 14 | 20 |
| | Average | 31 | 44 | | Average | 34 | 48 |
| | Good | 29 | 41 | | Good | 18 | 25 |
| | Very good | 5 | 7 | | Very good | 1 | 1 |
| | Total | 71 | Total | | Total | | 100 |
| Level of application with rubrics | None | 2 | 3 | Level of scoring with rubrics | None | 4 | 6 |
| | Lower | 10 | 14 | | Lower | 8 | 11 |
| | Average | 29 | 41 | | Average | 32 | 45 |
| | Good | 25 | 35 | | Good | 19 | 27 |
| | Very good | 4 | 6 | | Very good | 8 | 11 |
| | Those who did not respond | 1 | 1 | | Total | 71 | 100 |
| | Total | 71 | 100 | | | | |
| Level of interpretation of scores obtained after rubric scoring | None | 2 | 3 | | | | |
| | Lower | 7 | 10 | | | | |
| | Average | 27 | 38 | | | | |
| | Good | 27 | 38 | | | | |
| | Very good | 7 | 10 | | | | |
| | Those who did not respond | 1 | 1 | | | | |
| | Total | 71 | 100 | | | | |

Table 3 shows that most teachers have moderate knowledge of rubric. Besides, it was determined that the majority of teachers had a moderate level of proficiency in preparing rubric, applying, scoring and interpreting the scores obtained from the rubric. The studies evaluated by the teachers with rubric were presented in Table 4.

Table 4. *Studies of teachers evaluated with a rubric*

| Items | **n** | **%** |
|---|---|---|
| Products: composition, article writing, graphic drawing, experiment setting, etc. | 34 | 48 |
| High-level thinking skills: acquiring knowledge, organizing, using, etc. | 24 | 34 |
| Observable performances: experimenting, sketching, drawing pictures, making a tool, etc. | 40 | 56 |
| Social skills: predisposition to group work, giving importance to others' ideas, expressing oneself, making presentations, etc. | 25 | 35 |
| Other | 4 | 6 |

When Table 4 was examined, it was found that science teachers often used rubrics to evaluate observable performances such as experimenting, sketching, drawing pictures, making a tool.

50 (70%) of science teachers stated that they had previously prepared rubric, while 21 (30%) stated that they had not prepared rubric before. The difficulties experienced by teachers who previously prepared rubric in this process were shown in Table 5.

Table 5. *Frequency of problems teachers face when preparing rubric*

| Items | Never<br>n (%) | Sometimes<br>n (%) | Always<br>n (%) | Those who didn't respond<br>n (%) | Total<br>n (%) |
|---|---|---|---|---|---|
| Understanding the explanations related to rubric | 12 (17%) | 35 (50%) | 1(%1) | 23 (32%) | 71 (100%) |
| Deciding the appropriate topic | 19 (27%) | 28 (39%) | 2 (3%) | 22 (31%) | 71 (100%) |
| Deciding the type of rubric | 5 (7%) | 35 (49%) | 9 (13%) | 22 (31%) | 71 (100%) |
| Deciding criteria | 15 (21%) | 27 (38%) | 7 (10%) | 22 (31%) | 71 (100%) |
| Making appropriate definitions of target behaviors | 10 (14%) | 35 (49%) | 4 (6%) | 22 (31%) | 71 (100%) |
| Using understandable expressions | 18 (25%) | 26 (37%) | 4 (6%) | 23 (32%) | 71 (100%) |
| Deciding the level of scoring | 15 (21%) | 29 (41%) | 5 (7%) | 22 (31%) | 71 (100%) |
| Making it suitable for student level | 15 (21%) | 33 (47%) | 1(%1) | 22 (31%) | 71 (100%) |

When examining Table 5, it was determined that the majority of science teachers sometimes had difficulty in understanding explanations, deciding on the appropriate subject, deciding on the type of rubric to use and deciding criteria for the performance to be measured.

It was also found that teachers sometimes had difficulty making definitions that fit the criteria to be included in the rubric, making clear statements, deciding the level of scoring, and making the rubric appropriate to the level of students.

51 (72%) of science teachers stated that they had previously practiced with the rubric. The situations that prevent teachers from practicing with rubric were presented in Table 6.

Table 6. *Situations that prevent teachers from practicing with rubric*

| Items | None<br><br>n (%) | Average<br><br>n (%) | Many<br><br>n (%) | Those who didn't respond<br>n (%) | Total<br><br>n (%) |
|---|---|---|---|---|---|
| Limited knowledge of rubric | 7 (10%) | 39 (55%) | 5 (7%) | 20 (28%) | 71 (100%) |
| Lack of knowledge about students' use | 4 (6%) | 34 (49%) | 13 (18%) | 20 (28%) | 71 (100%) |
| Crowded classroom | 6 (8%) | 29 (41%) | 16 (23%) | 20 (28%) | 71 (100%) |
| Students' indifference to the course | 7 (10%) | 29 (41%) | 15 (21%) | 20 (28%) | 71 (100%) |
| Absenteeism of students | 16 (23%) | 20 (28%) | 15 (21%) | 20 (28%) | 71 (100%) |
| Negative attitude of students towards rubric | 12 (17%) | 27 (38%) | 12 (17%) | 20 (28%) | 71 (100%) |
| Ineligibility to class level | 18 (25%) | 26 (37%) | 7 (10%) | 20 (28%) | 71 (100%) |
| Difficulties in classroom management | 16 (22%) | 29 (41%) | 6 (9%) | 20 (28%) | 71 (100%) |
| Being time consuming | 5 (7%) | 26 (37%) | 20 (28%) | 20 (28%) | 71 (100%) |

Table 6 shows that the fact that most teachers have a limited level of knowledge about rubrics moderately affects their practice with these tools. In addition to this, children's lack of knowledge about the use of a rubric, the overcrowding of the classroom, the lack of interest in the classroom, and difficulties in classroom management affect the teachers' use of these tools in the classroom at a moderate level.

56 (79%) of the teachers with prior knowledge had previously scored with the rubric, while 15 (21%) had not previously scored with a rubric. The frequency of teachers' behavior when scoring with rubric was shown in Table 7.

Table 7. *Frequency of behaviors that teachers demonstrate when scoring with rubric*

| | Never<br>n (%) | Sometimes<br>n (%) | Always<br>n (%) | Those who didn't respond<br>n (%) | Total<br>n (%) |
|---|---|---|---|---|---|
| I'm being objective. | 0 (0%) | 6 (8%) | 50 (70%) | 15 (21%) | 71 (100%) |
| I'm being lenient. | 5 (7%) | 18 (25%) | 33 (47%) | 15 (21%) | 71 (100%) |
| I give each student close scores regardless of performance | 41 (58%) | 11 (15%) | 3 (4%) | 15 (21%) | 71 (100%) |
| The student's overall success in the class affects my scoring. | 23 (33%) | 30 (42%) | 3 (4%) | 15 (21%) | 71 (100%) |
| The student's disciplinary behavior in the classroom environment affects my scoring. | 19 (27%) | 30 (42%) | 7 (10%) | 15 (21%) | 71 (100%) |

Looking at Table 7, teachers stated that they were always objective and tolerant, never giving close scores without looking at performance, sometimes affecting the student's overall success in the classroom and their disciplinary behavior.

## 4. Discussion and Conclusion

This study aims to determine the proficiency of science teachers in developing, using, and scoring rubrics skills and the difficulties they experienced in these processes. In this study, it was revealed that teachers felt partially adequate in preparing rubric, applying rubric and scoring, and faced some difficulties in these processes.

First of all, in this study, it was determined that science teachers had intermediate-level knowledge about the rubric. When we look at this conclusion of the research, it is seen that it parallels the results of the previous studies (Duran, Mıhladız, Ballıel, 2013; Özdemir, 2010). There are also studies in the literature that determine teachers have insufficient knowledge about rubric (Özdemir, 2010; Şenel, Pekdağ, Günaydin, 2018). It is also remarkable that many of the teachers who knew about the rubric in the study had little years of seniority and heard the rubric for the first time in undergraduate education. This shows that new teachers have an awareness of rubric, but not an adequate level of knowledge, especially with the inclusion of alternative assessment methods in the programs. Similarly, Watt (2005) found that although teachers with little teaching experience had more positive attitudes towards alternative assessment methods, they did not choose to use them. Researchers have expressed satisfaction with the traditional exams that teachers use to determine student abilities.

In the study, the difficulties encountered in preparing rubrics were examined, and it was found that teachers sometimes had difficulty deciding the appropriate subject, the type of rubric to be used (analytical or holistic) and the appropriate criteria, understanding the explanations related to the rubric, making the appropriate definitions related to target behaviors, using understandable expressions, deciding the level of scoring, making it suitable for the student level. Although it has been determined that half of the teachers who participated in the study had previously prepared rubric, we can attribute the difficulty that they experienced to various

reasons in the situations mentioned above. The first of the reasons can be cited as teachers' lack of knowledge about rubrics. The other reason may be that teachers take advantage of the rubrics that are readily available instead of preparing rubrics. In the studies, it is stated that the teachers did not prepare the rubrics themselves and often used ready templates (Algan, 2008; Adanalı, 2008). It has also been stated that teachers have difficulty in evaluating due to their inability to find sample rubrics from textbooks and the internet (Metin, 2013). Another reason can be thought of as teachers not using rubric-like tools in evaluating performance-oriented studies. Şenel, Pekdağ, and Günaydın (2018) found that teachers did not consider scoring as necessary in their work to create products or solutions such as tasks, portfolios, projects. Besides, the researchers determined that in scoring open-ended questions, teachers followed rubric-like approaches but carried it out with their techniques. There are studies in the literature that support the conclusion that teachers have difficulty deciding the appropriate criteria when developing rubrics (Metin and Özmen, 2010; Akbaş and Gençtürk, 2013). This suggests that teachers do not know the basic elements that constitute skills such as critical thinking, problem-solving, creative thinking, and do not set standards for evaluating them. Failure to set assessment criteria can result in teachers not being able to set relevant targets for what they are going to teach students, so evaluations are mostly based on opinion. The fact that the evaluation criteria are based on belief makes it clear that each student can be evaluated with different criteria. This may result in performance-based assessments not being measured validly and reliably. In his study Metin (2010), he determined that teachers needed training at the point of preparing rubric. The study focuses on the general characteristics of rubrics and how to determine the criteria to be included in rubrics.

The study found that most of the teachers had previously practiced with the rubric. Also, it was revealed that teachers used the rubrics to evaluate the products (composition, writing articles, drawing charts, creating experimental apparatus and social skills, etc.) and observable performances (making experiments, sketching, drawing pictures, making a tool, etc.). It was revealed that the teachers were partially affected by the difficulties such as the limited level of knowledge about rubric while practicing with the rubric, the lack of knowledge about the use of rubric by the students, the overcrowding of the class, the indifference of the students to the class, the absences of the students to the class, the negative attitudes of the students towards rubric, the teachers' having little practice with rubrics can cause these problems. Upon examination of the literature, it was determined that the rubric is an assessment and evaluation tool used by teachers with little frequency (Acar and Anıl, 2009; Akbaş, Gençtürk, 2013). Besides, teachers' lack of knowledge about how to use rubrics can be cited as another reason for the difficulty that they experienced. Metin (2010) determined in his study that teachers needed training on how to apply the rubric. When the literature was scanned, there were no studies on the difficulties experienced by teachers in using the rubric, and the studies were mostly directed at alternative methods of assessment and evaluation. The teachers obtained in these studies have insufficient knowledge (Duran et al., 2013; Özenç and Çakır, 2015; Demir, 2015), crowded classes, lack of time (Çetin, 2011; Demir, 2015; Okur and Azar, 2011) and negative attitudes of students towards these practices (Duban and Küçükyılmaz 2008; Tatar and Ören 2009) were found to have parallels with our research results.

Finally, the study determined that most teachers had previously scored with a rubric. It has been revealed that teachers who score with rubric are always objective and tolerant, that they do not give close scores to each student without looking at performance, and that sometimes the student's overall success in class and disciplinary behavior affect their scoring. When the literature is examined, it is noted that rubrics with clear and well-defined criteria make positive contributions to the objectivity of the performance evaluation process (Venning and Buisman-Pijlman 2013, Jonsson, 2014; Reynolds et al, 2009). When the answers given by the teachers

were examined, a contradictory situation was revealed that the teachers displayed both partial and objective behaviors in their rubric assessment. This suggests that teachers do not make much assessment with the rubric. Besides, high-grade expectations of students and parents in performance-based evaluations can be cited as the reason why teachers are not objectivity in using these tools. In his study, Metin (2010), stated that teachers felt inadequate about how to convert rubrics into notes and they needed in-service training.

Based on these results, the following suggestions can be made for future studies:

- Teachers should be given in-service training on the importance of assessing and evaluating high-level thinking skills. In this context, in addition to theoretical information about the development, implementation, and evaluation of rubrics, sample applications should be presented.
- Valid and reliable rubrics for evaluating high-level thinking skills in various subjects should be developed and made available to teachers.
- The education courses taken at the undergraduate level of the teacher candidates should be given rubrics and the teacher candidates should be trained better in the subject.
- Doing this kind of work on larger scale groups will ensure that more healthy information is obtained.

## 5. Conflict of Interest

The author declares that there is no conflict of interest.

## 6. Ethics Committee Approval

The author confirms that the study does not need ethics committee approval according to the research integrity rules in their country.

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