# Using Twitter as a Tool of Teacher Professional Development

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**Summary**
This study aimed to determine the extent to which teachers use Twitter for their professional development (PD). It also explores their attitudes towards such a social networking tool. A cohort of 405 teachers was sampled, and a questionnaire was used to collect the relevant data from this sample. The validity of the questionnaire was checked through the validity of the arbitrators and design. Cronbach's alpha coefficient showed a good stability value of the tool as it was 0.82, 0.93, and 0.81 for the axes of direction, use, and difficulties, respectively. Findings showed an average level of teachers' attitudes, uses, and challenges in using Twitter for PD. The statistical analysis of the data showed no significant differences between the participants' responses attributable to workplace and age. Contrarily, there were statistically significant differences between the participants' responses regarding their qualifications, the beginning of their use of Twitter, and the number of times they used it.
*Keywords:professional development (PD), teachers, technology, social networks*

## 1. Introduction

Twitter, which is currently one of the most popular communication tools, has become very popular among millions of users. Owing to its wide spread, various organizations and institutions have sought to benefit from it, as in the field of marketing and advertising [1], politics [3], medicine [4], and many other fields.

Many educational benefits of Twitter have been researched and reported, including following conversations on a specific topic with continuous updates by adding the hashtag (#). When searching for a particular topic, the user is satisfied with searching for the topic followed by the hashtag. As well, it enables users to categorize their tweets, making it easy to search for a topic [5-6].

Moreover, Twitter is construed as a channel of communication between teachers and their students. By using it as a virtual blackboard on which the teachers places the important points that they want to convey to their students; They can put the course vocabulary, the advertisements they send to their students from time to time during the semester and the assignments and deadline of submissions [7]. Besides, it may be an educational tool that affects students' achievement in their tests and the performance of their weekly homework [8-10].

On the other hand, Twitter is an important tool for the professional development (PD) of teachers. One of the most important uses of Twitter in this field indicated by many studies is forming professional relationships with their counterparts in different countries: Common topics are discussed, professional experiences are exchanged, and new knowledge and skills are acquired [11-13].

What is more, teachers spend most of their time with students during the school day, which makes the proportion of time devoted to teachers' PD very small. In addition, the opportunities provided by school administrations for the teachers' PD are insufficient [14]. Therefore, flexibility in the time and place of information acquisition is one of the most important reasons for using Twitter in PD [15].

Furthermore, Twitter provides a suitable environment for teachers who want to develop themselves in a particular field by identifying the people and entities they wish to follow or whom they want to follow. This enables following special accounts that help teachers to develop a specific skill or technique without the need to go through the details previously acquired in other programs [16].

Teachers who live in remote areas with no training centers to develop their teaching skills feel frustrated about what may affect their teaching practices. Hence, Twitter is an ideal option for them. It opens communication channels with their counterparts in other regions and makes them aware of what is new in their academic or teaching field [17].

Add to that, the financial burdens resulting from the traditional PD programs are considered an obstacle for the employees in their PD. Using Twitter enables development without incurring additional financial obligations [17-18]. Nadji's [19] concluded that Twitter could be used as an alternative to traditional PD limited by specific financial and time requirements. In addition, through Twitter, it is possible to participate in conferences completely without actually attending the conference, not only by tweeting about the conference magazine, reports or blogs directly after the meeting but also by attaching presentation programs, attachments, photos, or videos related to At the conference [15].

Twitter is also an important channel for new educators. New teachers face a lack of knowledge for the subjects they teach, so that they may turn to Twitter. It provides them with the skills and resources that may help them to perform their teaching duties efficiently and easily [20].

Despite the multiple services that Twitter provides to teachers interested in developing themselves professionally (developing their teaching skills, broadening their knowledge horizons, and deepening their academic disciplines), there are some obstacles that they may face in using such social applications for PD [21-23].

One of the obstacles that some teachers may avoid using Twitter in PD is the limited number of characters in each tweet [24]. In other words, some teachers believe that this feature causes incompleteness of the idea or information, which results in a distortion of the acquired knowledge. Hence, the users tend to use other sources on the Internet or even use other social networking tools that give greater freedom in this area. This is what was indicated by the study of Carpenter et al. [17]. The study showed that 23% of the sample belonging to the United States used Twitter, compared to 71% of them using Facebook.

Among those obstacles are privacy and security. Both are touted as a common obstacle from the point of view of some individuals. Most of what is provided through social media tools, regardless of the program through which the information is presented [25]. It goes without saying that Twitter is an open space for everyone to tweet and express an opinion. By having an account, the user simply becomes able to participate in content without verifying the user's identity [26], encouraging terrible users to share harmful links meant for reaching private data and thus manipulating the hacked dataset [27].

Also, managing time while using Twitter is very important. Some studies have shown that some users believe that it is challenging to set time while using it. They may spend long hours browsing the program, moving from account to account and from tag to tag that may be unrelated to the topic of research. It may develop into addiction and difficulty to stay away from it. The teachers may also enter into long discussions with others that are difficult to get out of [21, 24, 28].

In addition to the obstacles above, fake Twitter accounts have spread widely, and this has become the most important obstacle to using Twitter in teachers' PD. These accounts often publish their tweets with hashtags that reach a high level of participation and are often accompanied by links that take the user to topics that are not related to the topic of the hashtag, or links that take the user to pornographic sites [26], or malicious links [27], or they work on re-tweet automatically through multiple accounts or from one account [29].

## 2. Research Questions

The study intends to find out the possibility of using Twitter as a tool for teachers' PD. It is an attempt to address the following questions:

1.   What are the teachers' attitudes towards Twitter as a tool for their professional development?
2.   To what extent do teachers use Twitter in their professional development?
3.   What are the difficulties teachers face in using Twitter as a tool for professional development?
4.   Are there any statistically significant differences between the participants' responses related to the workplace variable, qualification, age, beginning of using Twitter, and the number of times it is used?

## 3. Methods, Population, and Sampling

The study adopted the descriptive approach to study the phenomenon. The research design is suitable for quantitative descriptions of the trends, directions, and opinions of a sample of participants [30].

The study population consisted of all public education teachers, and as a result of the large study population, a sample of 405 teachers representing the population was selected. Table 1 outlines the sample in terms of the variables of place, age, qualification, the first use of Twitter began, and the number of times it was used

**Table 1:** A Description of the Participants According to the Workplace

| Place | City | Village | Total |
|-------|------|---------|-------|
| N | 334 | 71 | 405 |

As the table indicates,  the number of teachers in the city is 334 (about 82%), while the number of teachers working in the villages is 71 (about 18%).

**Table 2:** A Description of the Participants  According to Age

| Age | N |
|-----|---|
| 20- below 30 | 63 |
| 30- below 40 | 192 |
| 40- below 50 | 130 |
| 50- below 60 | 20 |
| Total | 405 |

The table shows that most of the participants were between 30 and 50 years, where they represented 79.5% . 20.5% represented the rest of the sample whose age was less than 30 or more than 50.

**Table 3:** A Description of the Participants  according to Qualification

| Qualification | BA | Higher studies | Total |
|---------------|-----|----------------|-------|
| N | 310 | 95 | 405 |

It is clear from Table 3 that the number of teachers who hold a bachelor's degree is higher than those who have a master's or doctorate. They represent 76.5% of the sample size.

**Table 4:** A Description of the Participants According to their first uses of Twitter

| First Twitter use | N |
|---|---|
| Less than 6 months | 46 |
| Less than a year | 53 |
| Less than 2 years | 72 |
| Less than 3 years | 59 |
| 3 years and more | 175 |
| Total | 405 |

It is clear from Table 4 that about 43% of the respondents used Twitter for three years or more, while 18% of the sample indicated that their use of Twitter began two years ago. 15% of the respondents stated that their use of Twitter was less than three years ago, and the rest of the respondents were those who started using Twitter for a year or less.

**Table 5:** A Description of the sample according to the number of times they use Twitter

| Frequency if use | N |
|---|---|
| More than once in a day | 239 |
| Once a day | 83 |
| Once a week | 45 |
| Once a month | 14 |
| Rarely in a year | 24 |
|  | 405 |

It is clear from Table 5 that more than half of the sample, representing 59% of the sample size, used Twitter more than once a day. 21% of the sample indicated that they used Twitter once a day. The rest of the sample used Twitter once a week, once a month, and rarely during the year, the percentages were 11%, 3%, and 6%, respectively.

A questionnaire was used as a data collection tool for the study, and it was made of two parts. The first part contains the variables: the place of work, age, qualification, the beginning of using Twitter, and the number of times using Twitter. The second part consists of three sub-parts that represent the study's axes: (a) the teachers' attitudes towards the use of Twitter in PD. It consists of nine phrases, (b) the extent to which teachers use Twitter in PD. It consists of ten terms and (c) the teachers' difficulties in using Twitter as a PD means. It consists of thirteen terms. The questionnaire was used electronically to ease access for teachers. A Google Form was used to create the questionnaire; then a link was copied and sent to teachers in coordination with the Education Offices in Makkah.

The tool was presented to some specialists to take their suggestions about its phrasing to measure its validity and reliability. Then it was piloted to a sub-sample of participants to ensure its validity and reliability. Cronbach's alpha was calculated for the three axes. It was as follows: Cronbach's alpha coefficient of teachers' attitudes towards using Twitter for PD was higher than 0.82, the extent to which teachers used Twitter in their PD was greater than 0.93, and the difficulties they faced in using Twitter in their PD was above 0.81. This indicates the validity of the instrument. The construct validity of the tool was also measured using CFA factor analysis. The first axis related to trends was tested as displayed in Table 6. There was one factor representative of the scale expressions according to the following results: $x^2=431.113$, p-value=<0.0001, RMSEA=0.19, CFI=0.73, GFI=0.81.

**Table 6:** Standard Squared Root of the Direction Axis

| No. | items | Sqrts |
|---|---|---|
| 1 | I think Twitter is an appropriate way to follow up on news about the specialty | .668 |
| 2 | I think every teacher should have a Twitter account | .693 |
| 3 | I think every education department should have an effective Twitter account | .764 |
| 4 | I don't prefer dealing with social media in general | .231 |
| 5 | If my school where I work had a Twitter account, I would definitely follow it | .665 |
| 6 | I think that following the accounts of education specialists will help me a lot in the teaching profession | .893 |
| 7 | I think Twitter is a waste of time | .207 |
| 8 | I think Twitter is boring and doesn't encourage professional development | .031 |
| 9 | I think Twitter is a fertile field for acquiring diverse knowledge | .751 |

The second axis which is related to the extent to which teachers use Twitter in their PD, the construct validity of the tool was measured using CFA factor analysis, and the results displayed in Table 7 are according to the following results: $x^2=231.918$, p-value=<0.0001, RMSEA=0.11, CFI=0.92, GFI=0.9. These results indicate that there is one factor representative of the scale statements.

**Table 7**: Standard Squared Root of the Usage Axis

| No. | Items | Sqrts |
|---|---|---|
| 1 | I use Twitter to learn new teaching strategies | 0.761 |
| 2 | I use Twitter to see the latest technology and educational tools | 0.761 |
| 3 | I use Twitter to connect with fellow professionals around the world | 0.762 |
| 4 | I use Twitter to find effective solutions to educational problems I face in class | 0.784 |

| 5 | I use Twitter to share my professional experiences and expertise with educational practitioners | 0.826 |
|---|---|---|
| 6 | I use Twitter to follow accounts that are interested in my field | 0.762 |
| 7 | I use Twitter to follow conferences around education | 0.829 |
| 8 | I use Twitter to connect with former students and learn about my strengths and weaknesses | 0.663 |
| 9 | I use Twitter to find out about the workshops and courses that are held in the specialty through electronic platforms such as the Rawaq platform | 0.825 |
| 10 | I participate in the [hashtags] that raise topics related to education or specialization | 0.632 |

The construct validity of the third axis, which is related to the difficulties that teachers face in using Twitter in PD, was measured using CFA factor analysis, and the results were as follows: $x^2=462.783$, p-value =<0.0001, RMSEA=0.123, CFI=0.733, GFI= 0.814. These results indicate that there is one factor representative of the axis statements (see Table 8).

**Table 8**: Standard Square Roots of the Difficulties Axis

| No. | Items | Sqrts |
|---|---|---|
| 1 | I have a difficulty in logging into my Twitter account | 0.412 |
| 2 | Bad impression I already had of Twitter as a social media | 0.481 |
| 3 | My lack of knowledge of educational Twitter applications | 0.472 |
| 4 | The educational supervisor does not believe in the role that Twitter plays in the educational process | 0.483 |
| 5 | Difficulty in providing internet in the area in which I live | 0.42 |
| 6 | Twitter's [140 character] character limit makes me avoid using it to communicate with colleagues | 0.558 |
| 7 | It is difficult for me to follow the conversations that occur between colleagues in the profession about specialization | 0.56 |
| 8 | I don't have enough experience to use Twitter | 0.54 |
| 9 | Difficulty setting time when using Twitter, which means spending many hours on the program | 0.513 |
| 10 | I don't trust the information provided on Twitter | 0.667 |
| 11 | Lack of reliable accounts in a specialized field | 0.678 |
| 12 | Fear of violating personal privacy | 0.621 |
| 13 | Many fake accounts that may repeat re-tweets annoyingly | 0.568 |

## 4. Results

Q1: What are the teachers' attitudes towards using Twitter as a tool for their professional development?
The averages and standard deviations of expressions from the first to the ninth were calculated (see Table 9). The general average for the axis was 3.28 out of 5.00 on the five-point Likert scale, with a standard deviation of 0.73, which is as close to neutral as possible.

**Table9:** Teachers' Attitudes Towards Using Twitter as a tool for PD

| | Items | Mean | SD |
|---|---|---|---|
| 1 | I think Twitter is an appropriate way to follow up on news about the specialty | 3.24 | 1.17 |
| 2 | I think every teacher should have a Twitter account | 3.26 | 1.15 |
| 3 | I think every education department should have an effective Twitter account | 3.99 | 1.12 |
| 4 | I don't prefer dealing with social media in general | 2.75 | 1.18 |
| 5 | If my school where I work had a Twitter account, I would definitely follow it | 3.75 | 1.2 |
| 6 | I think that following the accounts of education specialists will help me a lot in the teaching profession | 3.62 | 1.11 |
| 7 | I think Twitter is a waste of time | 2.65 | 1.06 |
| 8 | I think Twitter is boring and doesn't encourage professional development. | 2.78 | 1.07 |
| 9 | I think Twitter is a fertile field for acquiring diverse knowledge | 3.48 | 1.13 |
| 10 | The overall sum of the axis | 3.28 | 0.73 |

As Table 9 indicates, the statement that got the highest average is the third statement. It suggests that the cohort of participants believe - to a large extent- that every education administration should have an influential account on Twitter. It got an average of 3.99 and a standard deviation of 1.12. Most of the participants disagreed on the seventh statement ( see Table 9) that got a mean value of 2.65 and a standard deviation of 1.06. It varied between a medium and weak degree of agreement.

**Q2: To what extent do teachers use Twitter in their professional development?**
As for the second research question, the general mean and standard deviation were calculated for the expressions related to this axis, from the tenth to the nineteenth. The results are outlined in Table 10.

**Table 10**: The Extent to Which Teachers Use Twitter in their PD

| No. | items | Means | SD |
|---|---|---|---|
| 10 | I use Twitter to learn new teaching strategies | 2.77 | 1.11 |
| 11 | I use Twitter to see the latest technology and educational tools | 2.98 | 1.12 |
| 12 | I use Twitter to connect with fellow professionals around the world | 2.36 | 1.16 |
| 13 | I use Twitter to find effective solutions to educational problems I face in class | 2.67 | 1.15 |
| 14 | I use Twitter to share my professional experiences and expertise with educational practitioners | 2.54 | 1.18 |
| 15 | I use Twitter to follow accounts that are interested in my niche | 3.14 | 1.23 |
| 16 | I use Twitter to follow conferences around education | 2.72 | 1.20 |
| 17 | I use Twitter to connect with former students and learn about my strengths and weaknesses | 2.20 | 1.17 |
| 18 | I use Twitter to find out about the workshops and courses that are held in the specialty through electronic platforms such as the Rawaq platform | 2.61 | 1.23 |
| 19 | I participate in the [hashtags] that raise topics related to education or specialization | 2.70 | 1.22 |
|  | Overall sum of the axis | 2.70 | 0.93 |

Table 10 shows the extent to which teachers use Twitter in PD with an overall mean of the axis 2.7 and the degree of standard deviation was 0.93. This indicates that the degree of Twitter uses ranged from medium to weak. The phrase "I use Twitter to follow accounts that are interested in my niche" had the highest mean among the axis phrases, with a score of 3.14 and a standard deviation of 1.23. On the other hand, the term "I use Twitter to communicate with former students and know my strengths and weaknesses" got the lowest arithmetic average among the axis phrases. The arithmetic mean for the term was 2.20 and a standard deviation of 1.17. This means that the participants' agreement with this phrase is somewhat weak.

### Q 3: What are the difficulties teachers face in using Twitter as a tool for PD?

The means and degrees of standard deviation were calculated for the expressions belonging to the axis, in addition to the value of the general mean value of the axis and the degree of standard deviation to answer this question (see Table 11).

**Table 11**: Difficulties Faced by Teachers in Using Twitter as a Tool for PD

| No. | items | Means | SD |
|---|---|---|---|
| 20 | I'm having a hard time logging into my Twitter account | 1.73 | 0.99 |
| 21 | Bad impression I already had of Twitter as a social media | 2.16 | 1.03 |
| 22 | My lack of knowledge of educational Twitter applications | 2.33 | 1.06 |
| 23 | The educational supervisor does not believe in the role that Twitter plays in the educational process | 2.67 | 1.13 |
| 24 | Difficulty in providing internet in the area in which I live | 2.24 | 1.19 |
| 25 | Twitter's [140 character] character limit makes me avoid using it to communicate with colleagues | 2.63 | 1.24 |
| 26 | It is difficult for me to follow the conversations that occur between colleagues in the profession about specialization | 2.57 | 1.15 |
| 27 | I don't have enough experience to use Twitter | 2.19 | 1.11 |
| 28 | Difficulty setting time when using Twitter, which means spending many hours on the program | 2.83 | 1.19 |
| 29 | I don't trust the information provided on Twitter | 2.84 | 1.06 |
| 30 | Lack of reliable accounts in a specialized field | 2.82 | 1.16 |
| 31 | Fear of violating personal privacy | 2.88 | 1.20 |
| 32 | Many fake accounts may repeat re-tweets annoyingly | 2.27 | 1.31 |
| 33 | The overall sum of the axis | 2.55 | 0.67 |

Table 11 shows that the difficulties the teachers face in using Twitter as a tool for PD were less than average to weak. The general average of the axis was 2.55 and a standard deviation score of 0.67. The first statement that indicated the difficulty of accessing their Twitter account got the lowest arithmetic average of 1.73 and a standard deviation of 0.99. This means the sample did not agree with what was stated in the statement.

In the previous table, the phrase "a lot of fake accounts that may repeat re-tweets annoyingly" got the highest mean among the axis phrases. It got arithmetic mean value of 3.27 and a standard deviation of 1.31. This value indicates that the degree of agreement of the sample members for this statement ranged from average to highly agreeable.

### Q4: Are there any statistically significant differences between the responses of the participants related to the variable of place of work, qualification, age, beginning of using Twitter, and the number of times it is used?

The researcher used the *t-test* to determine the differences in the average trend, usage, and difficulties between those who work inside or outside the city. The results of the *t* value are shown in the following table were reached.

**Table 12:** T-Test Results for the three Dimensions (attitude, use, and difficulties) According to the Workplace

| Variable | Workplace | Mean | F | t | Sig. |
|---|---|---|---|---|---|
| attitude | City N= 334 | 3.281 | 403 | 0.08 | 0.937 |
| | Village N= 71 | 3.273 | | | |
| Uses | City N= 334 | 2.707 | 403 | 0.41 | 0.684 |
| | Village N= 71 | 2.658 | | | |
| Difficulties | City N= 334 | 2.565 | 403 | 0.79 | 0.429 |
| | Village N= 71 | 2.495 | | | |

Results in Table 12 shows that the value of *t* was 0.08, 0.41, 0.79 for the three dimensions of the questionnaire, respectively (trend, use, difficulties). These results mean that they were not statistically significant at the level of 0.05. There are no statistically significant differences in the average scores of the three axes between the users who work in the city or those who work in the village. Generally, it can be argued that differences between teachers' responses to the axes of the questionnaire according to the difference in their workplace are non-existent.

As for the educational qualification variable, the researcher used the t-test to determine the significance of the differences in the average of (trend, use, difficulties) between those who hold a bachelor's degree or graduate studies. The *t* value is shown in the following table.

**Table 13:** T-Test Results for the Three Dimensions) direction, use, and difficulties*)* According to Qualification

| Variable | Qualification | Mean | DF | t | Sig. |
|---|---|---|---|---|---|
| attitude | BA N= 310 | 3.168 | 403 | -5.79 | >0.0001 |
| | Higher studies N= 95 | 3.646 | | | |
| Uses | BA N= 310 | 2.591 | 403 | -4.31 | 0.0001> |
| | Higher studies N= 95 | 3.050 | | | |
| Difficulties | BA N= 310 | 2.579 | 403 | 1.43 | 0.154 |
| | Higher studies N= 95 | 2.466 | | | |

According to the *t* value, the variable of difficulties reached 1.43. The results showed no statistical significance at the level of 0.05. There are no statistically significant differences in the average degrees of difficulty between those who hold a bachelor's degree or those who have qualifications of higher studies (MA & Ph.D.).
Contrarily, the t value of the variables attitude and use reached -5.79 and -4.31. It is statistically significant at the level of 0.05, and these differences were in favor of those who hold a postgraduate qualification (MA & Ph.D.).
As for the variables of age, the beginning of the Twitter use, and the number of times it was used, the ANOVA was used

to find out the differences between the participants. The following table shows the effect of the age variable on the sample's responses to the three questionnaire axes.

**Table 14:** The ANOVA Results of the Effect of Age on the Participants' Views on the three dimensions (attitude, use, and difficulties)

| Dimensions | Variance source | Sum of Squares | DF | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Dimension 1 attitude | Between groups | 2 | 3 | 0.67 | 1.25 | 0.291 |
| | Within groups | 213.866 | 401 | 0.533 | | |
| | sum | 215.866 | 404 | | | |
| Dimension 2 Uses | Between groups | 0.925 | 3 | 0.308 | 0.36 | 0.785 |
| | Within groups | 347.934 | 401 | 0.868 | | |
| | sum | 348.859 | 404 | | | |
| Dimension 3 Difficulties | Between groups | 1.141 | 3 | 3.424 | 2.56 | 0.0549 |
| | Within groups | 179.005 | 401 | 1.141 | | |
| | Sum | 182.429 | 404 | | | |

The results included in the previous table indicate that the P-value reached 1.25, 0.36, and 2.56 for the questionnaire's three dimensions, respectively. It becomes clear that there are no statistically significant differences in the average scores of the three dimensions between teachers' ages at the level of 0.05.

Also, one-way analysis of variance (ANOVA) was used to find out the differences between the participants' responses to the questionnaire axes according to the variable of beginning to use Twitter, and the results were as in the following table.

**Table 15:** Analysis of Variance of the Effect of Beginning to use Twitter on the Views of the Participants on the Three dimensions (attitude, use, and difficulties)

| Dimensions | variance source | Sum of Squares | DF | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Dimension 1 attitude | Between groups | 18.247 | 4 | 4.562 | 9.23 | 0.0001< |
| | Within groups | 197.618 | 400 | 0.494 | | |
| | sum | 215.865 | 404 | | | |
| Dimension 2 Uses | Between groups | 9.811 | 4 | 2.453 | 2.89 | 0.022 |
| | Within groups | 339.048 | 400 | 0.848 | | |
| | sum | 348.859 | 404 | | | |
| Dimension 3 Difficulties | Between groups | 7.926 | 4 | 1.981 | 4.54 | 0.0013 |
| | Within groups | 174.503 | 400 | 0.436 | | |
| | Sum | 182.429 | 404 | | | |

As displayed in the previous table, the calculated p-value reached [9.23, 2.89, 4.54] for the three dimensions of the questionnaire, respectively, and that there are statistically significant differences between the four temporal levels of the beginning of Twitter use in all three dimensions [trend, usage, and difficulties] at the level of Significance [0.05]. The Tukey-Kramer test was used to find out the direction of the differences (see Table 16)

**Table 16:** A Comparisons between the Categories of the Variable of Beginning to Use Twitter According to the Responses of the participants to the Trend Axis

| categories )(groups | means | Less than 6 months | Less than a year | Less than 2 years | Less than 3 years | 3 years and more |
|---|---|---|---|---|---|---|
| Less than 6 months | 2.756 | | * | * | * | * |
| Less than a year | 3.155 | * | | | | |
| Less than 2 years | 3.250 | * | | | | |
| Less than 3 years | 3.386 | * | | | | |
| 3 years and more | 3.432 | * | | | | |

As Table 16 indicates, there are statistically significant differences between the average scores of the sample in the first dimension related to trends towards using Twitter in PD. This difference was between Twitter users for less than six months and those who started using Twitter more than six months ago. The results show that those who used Twitter for six months or less have less desire than others to use it for PD.

**Table 17:** A Comparisons between the Categories of the Variable Beginning to Use Twitter According to the Responses of the Participants to the Axis of Use

| categories )(groups | means | Less than 6 months | Less than a year | Less than 2 years | Less than 3 years | 3 years and more |
|---|---|---|---|---|---|---|
| Less than 6 months | 2.276 | | | | | * |
| Less than a year | 2.781 | | | | | |
| Less than 2 years | 2.749 | | | | | |
| Less than 3 years | 2.668 | | | | | |
| 3 years and more | 2.774 | * | | | | |

Table 17 shows statistically significant differences between the average scores of the sample in the second dimension related to the use of Twitter in professional development. This difference was between Twitter users for six months or less and those who have three years or more, and the differences were in favor of teachers who have been using it for more than three years.

**Table 18:** A Comparisons between the Categories of the Variable Beginning to Use Twitter According to the Participants' Responses to the Difficulties Axis

| categories (groups) | means | Less than 6 months | Less than a year | Less than 2 years | Less than 3 years | 3 years and more |
|---|---|---|---|---|---|---|
| Less than 6 months | 3.492 | | | | | |
| Less than a year | 3.120 | | | * | * | * |
| Less than 2 years | 2.891 | | | * | | |
| Less than 3 years | 2.833 | | | * | | |
| 3 years and more | 2.708 | | | * | | |

Touched on above, it is clear that there are statistically significant differences between the average scores of the sample in the third dimension related to the difficulties that teachers may encounter when using Twitter for professional development. This difference was between Twitter users for less than a year and those using it for more than a year. The differences were in favor of teachers who have been using Twitter for a year or less.

A one-way analysis of variance [ANOVA] was used to find out the differences between the responses of the participating teachers to the questionnaire axes according to the variable number of times of using Twitter, and the results are outlined in Table 19.

**Table 19:** Analysis of Variance of the Effect of the Number of Times of Use on the Views of the participants about the Three Dimensions of the questionnaire (Trend, Use, and Difficulties)

| Dimensions | variance | Sum of Squares | DF | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Dimension 1 attitude | Between groups | 30.320 | 4 | 7.580 | 16.34 | 0.0001< |
| | Within groups | 185.545 | 400 | 0.464 | | |
| | sum | 215.865 | 404 | | | |
| Dimension 2 Uses | Between groups | 22.681 | 4 | 5.670 | 6.95 | 0.0001< |
| | Within groups | 326.178 | 400 | 0.815 | | |
| | sum | 348.859 | 404 | | | |
| Dimension 3 Difficulties | Between groups | 7.860 | 4 | 1.572 | 1.31 | 0.235 |
| | Within groups | 174.569 | 400 | 0.574 | | |
| | Sum | 182.429 | 404 | | | |

Table 19 shows that the p-value reached 16.34, 6.95, and 1.31 for the questionnaire's three dimensions, respectively. It also shows statistically significant differences between the four temporal levels of the number of times of Twitter use in the first and second dimensions [attitude and usage] at the level of significance of 0.05. The Tukey-Kramer test was used to find out the direction of the differences.

**Table 20:** A Comparisons between the Categories of the Frequency of Twitter Uses According to the Participants' Responses to the Trend Axis

| categories (groups) | means | More than one time a day | Once a day | Once a week | Once a month | Rarely in a year |
|---|---|---|---|---|---|---|
| More than one time a day | 3.492 | | * | * | * | * |
| Once a day | 3.120 | * | | | | |
| Once a week | 2.891 | * | | | | |
| Once a month | 2.833 | * | | | | |
| Rarely in a year | 2.708 | * | | | | |

The previous table shows statistically significant differences between the average scores of the sample in the first dimension related to trends, and this difference was between Twitter users who use it more than once a day with all other groups. These differences were in their favour.

**Table 21:** A Comparisons between the Categories of the Frequency of Twitter Uses According to the Participants' Responses to the Usage Axis

| categories (groups) | means | More than one time a day | Once a day | Once a week | Once a month | Rarely in a year |
|---|---|---|---|---|---|---|
| More than one time a day | 2.841 | | | * | | * |
| Once a day | 2.677 | | | | | * |
| Once a week | 2.400 | * | | | | |
| Once a month | 2.650 | | | | | |
| Rarely in a year | 1.942 | * | * | | | |

The results displayed in Table 21 show that

1. There are statistically significant differences between the average scores of the sample in the second dimension related to the use of Twitter in the PD of teachers. This difference was between Twitter users who used it more than once a day and teachers who use it once a week or rarely during the year. These differences were in favor of the first category.
2. There are statistically significant differences between the average scores of the sample in the second dimension related to the use of Twitter in the teachers' PD, and this difference was between Twitter users

once a day and those who rarely use it a year, and the differences were in favor of the first category.

## 5. Discussion

The results indicated that the teachers' views towards Twitter as a means of PD are not clear and that there is a discrepancy in their responses between supporters and opponents. This may be due to the extent of their belief in the nature of Twitter and the services it may provide to teachers. To improve their teaching practices or acquire new knowledge. It is worth noting that this discrepancy is not limited to this study, as there are studies that agree with the result of this study [9, 31, 32].

The participants also believed that each education department should have an influential account on Twitter at the highest average, indicating that the sample believes that education administrations should create accounts for them in social media, especially Twitter. On these accounts are people who provide them with news, circulars or announcements about the administration. In addition, such twitter accounts make it easier for them to convey their voice to the official or reach other professional colleagues in the same educational administration, which is consistent with other studies [33].

On the other hand, the results showed that the sample did not agree that Twitter leads to time loss. This is an implicit acknowledgment by the participants in the study that Twitter may be benefited from PD and that the time the teacher spends browsing Twitter is not considered a waste of time. Still, on the contrary, he may find that it helps him in his teaching practices [34].

The results also indicated that teachers use Twitter to a weak degree. This may be the teachers' lack of interest in developing themselves, as the Ministry of Education does not require teachers to obtain a minimum number of courses to be promoted or remain in the educational sector [35]. The results indicated teachers' interest in following up accounts related to their academic specializations to acquire knowledge that might help them in the educational process. This is consistent with the study of Visser et al. [12], in which the sample members indicated that they follow other accounts that share the same educational interests

The results also indicated that most of the participants do not use Twitter to get feedback from their former students. This may be due to the difficulty of communicating with students after graduation and joining the university or other work, especially with no previous communication on Twitter [22,35].

In terms of difficulties, the study showed that there are no obstacles limiting faculty members' capabilities in using communication tools, including Twitter. This may be due to the spread of the culture of using social media tools in general and Twitter in particular among members of Saudi society, where the number of Twitter users has reached

more than twenty five million users [36]. The Arab communication tools report showed that 40% of the tweets in the Arab region were From Saudi Arabia in 2014 [22].

The results also displayed the spread of fake accounts on Twitter, especially in the hashtags [hashtags], one of the biggest obstacles facing the participants [29,37]. A large number of these annoying accounts in a particular hashtag may lead to the distance of those interested in the hashtag, thus affecting the direction of opinions. The different hashtags are marked as other voices that have not been heard. Reports interested in this regard indicate an increase in the number of fake accounts targeting the Kingdom of Saudi Arabia. These accounts often either contain similar content, or they do not interact with other Twitter accounts in response to a tweet, for instance [29].

The results of the analysis and comparisons between the responses of the participants according to the study variables (place of work, qualification, age, beginning of using Twitter, and the number of times it was used) showed no statistically significant differences between the responses of the participants who work in a city or village. This is consistent with Abu Yaqoub [38]. This could be attributable to the spread of Internet service in most regions of Saudi Arabia, the development of the technologies used to obtain it, not being limited to landlines, and the provision of data chips and towers that support high-speed 3rd and 4th generations. These things have significantly reduced the knowledge gap between those who work in a city or a village.

The results also showed that teachers who hold higher qualifications than a BA degree desired to use Twitter in PD. In addition to the fact that the results showed that they use Twitter for PD more than those who hold a BA degree, and this is consistent with the study of Hamadaneh and Al-Shawaheen [39], which indicated that Master's and Ph.D. holders' attitudes to using social media are higher than others. This may be due to their exposure during their master's or doctoral studies to topics that concern this type of professional development, or studies that have proven the effectiveness of using social media tools in general or Twitter in particular in PD [12,15,17].

All of this may raise the value of using Twitter in the teachers' PD for those who hold higher degrees more than others, which led to the emergence of these differences.

The results also indicated no statistically significant differences between the responses of the sample members according to the age variable. This is consistent with the conclusions of Alalawneh [40] that indicated that the age of the participants did not affect participation in the mass movement through the means of communication. This may stem from the widespread of smartphones among members of the society of all its spectrum. As it is known, many programs provide applications compatible with these devices. Thus the ease of access to the program contributed to its use from all ages. One of the results of this study indicated that the participants agreed on the ease of access to the program and that it did not represent an obstacle to them.

The results also showed statistically significant differences between the participants' responses according to the variable of beginning to use Twitter. It indicated that teachers who started late in using Twitter have less desire to use it for professional development, and they use it to a lesser extent than teachers who used it more than a year ago. In addition, the participants faced more significant difficulties in dealing with it than those who entered Twitter early. Thus, Older teachers of Twitter outperform their late starters in their use of Twitter for PD [17], as it is known that the beginning of Twitter was in 2006. The starting at this late time may indicate the negative trend about it previously and thus moving away from it, which, therefore, affects their use. This influence may extend to difficulties as it increases as the use decreases due to their lack of knowledge of Twitter's capabilities to its users.

In terms of the number of times that Twitter is used, the study showed statistically significant differences between the participants' responses on the axes of attitude and use. The results showed that those who use Twitter more than once a day among the participating teachers have a stronger tendency towards using it in developing themselves professionally. In addition, they used it more than other groups, meaning that teachers who are constantly in throughout the day use it for PD more than others [12]. This may result from their knowledge of the skills to deal with Twitter and search for information through hashtags or specialized accounts.

## 6. Recommendations

Based on the findings of this study, the researcher recommends the following:

- Providing teachers with positive attitudes towards Twitter is important due to its numerous educational contributions and applications. Therefore, educational administrations should educate them about this role by establishing training courses, workshops, and open meetings for those interested in this field.

- The education administrations should be keen to have an account on Twitter and encourage school leaders to do so, so that these accounts are influential by following up on all new news from the administration or school, in addition to making the follower aware of the current knowledge and teaching practices in the field.

- Encouraging teachers to self-develop professionally. They should harness the rich environment provided by Twitter to update their knowledge and improve their teaching practices if it is impossible to attend a face-to-face training program and remain stagnant without

developing their specialized knowledge or teaching practices.

- Establishing a periodical bulletin carried out by the education administration or the education offices. The periodical should contain a list of accounts interested in education and teaching methods in general and a list of accounts specialized in various scientific fields.

## 7. Suggestions

Educators are interested in integrating social networking tools into education since their appearance and the diversity of their programs, and this study - like other previous studies - sought to shed light on the reality of teachers' use of the Twitter social networking program in their PD, and based on the findings of the study, the researcher suggests Conducting a mixed study aimed at subjecting teachers to a PD program based on the Twitter communication program, then analyzing all the tweets made among the members participating in the survey to find out the actual needs for their PD, in addition to interviewing them to get their opinions in-depth about the experience

## References

[1] Kinney, L., & Ireland, J. [2015]. Brand spokes- characters as twitter marketing tools. *Journal of Interactive Advertising, 15*[2], 135-150.

[2] Leung, X. Y., Bai, B., & Stahura, K. A. [2015]. The marketing effectiveness of social media in the hotel industry: A comparison of Facebook and Twitter. *Journal of Hospitality & Tourism Research, 39*[2], 147-169.

[3] Jungherr, A., Schoen, H., & Jürgens, P. [2016]. The mediation of politics through twitter: An analysis of messages posted during the campaign for the German federal election 2013. *Journal of Computer-Mediated Communication, 21*[1], 50-68.

[4] Little, J.S., Romee, R. Tweeting from the Bench: Twitter and the Physician-Scientist Benefits and Challenges. *Curr Hematol Malig Rep 15*, 419–423 (2020).

[5] Fox, B. I., & Varadarajan, R. [2011]. Use of twitter to encourage interaction in a multi-campus pharmacy management course. *American Journal of Pharmaceutical Education*, *75*[5], 1-8.

[6] Carpenter, J; Tani, T.; Morrison, S. & Keane, J. (2020) Exploring the landscape of educator professional activity on Twitter: an analysis of 16 education-related Twitter hashtags. *Professional Development in Education,* 1-22. https://doi.org/10.1080/19415257.2020.1752287

[7] Al-Bahrani, A., & Patel, D. [2015]. Incorporating Twitter, Instagram, and Facebook in Economics Classrooms. *Journal of Economic Education*, *46*[1], 56-67.

[8] Ilkyu, H., & Chonggun, K. [2014]. Understanding user behaviors in social networking service for mobile learning: a case study with twitter. *Malaysian Journal of Computer Science*, *27*[2], 112-123.

[9] Davis, L. l., & Roger Yin, L. Y. [2013]. Teaching writing with twitter: an exploration of social media use in enhancing business communication skills. *Journal for Research in Business Education*, *55*[1], 36-52.

[10] Anderson, M. O. [2013]. Twitter effectiveness in motivating business students. *Journal of The Northeastern Association of Business, Economics & Technology*, *18*[1], 1-6.

[11] Chretien, K. C., Tuck, M. G., Simon, M., Singh, L. O., & Kind, T. [2015]. A digital ethnography of medical students who use Twitter for professional development. *Journal of general internal medicine*, *30*[11], 1673-1680.

[12] Visser, R. D., Evering, L. C., & Barrett, D. E. [2014]. #TwitterforTeachers: The implications of twitter as a self-directed professional development tool for k-12 teachers. *Journal of Research on Technology in Education*, *46*[4], 396-413.

[13] Xing, W., &Gao, F. (2018). Exploring the Relationship Between Online Discourse and Commitment in Twitter Professional Learning Communities. *Computers & Education, 126*, 388-398.

[14] Wei, R. C., Darling-Hammond, L., and Adamson, F. [2010]. Professional development in the United States: Trends and challenges. Dallas, TX. National Staff Development Council.

[15] Jones, J. [2013]. Twitter! - its potential for professional development. *Professional Development Today*, *16*[1], 54.

[16] Malik, A., Heyman-Schrum, C. & Johri, A. (2019) Use of Twitter across educational settings: a review of the literature. *Int J Educ Technol High Educ 16*, 36, 109-128.

[17] Carpenter, J. P., & Krutka, D. G. [2014]. How and why educators use twitter: A survey of the field. *Journal of Research on Technology in Education, 46*[4], 414-434.

[18] BEKA, A. [2014]. Social networks as significant factor in the professional development of young people in Kosovo. *Perspectives of Innovations, Economics & Business*, *14*[3], 147.

[19] Nadji, T. [2016]. Twitter and physics professional development. *Physics Teacher*, *54*[8], 486-487.

[20] Wesley, P.M. [2013]. Investigating the community of practice of world language educators on Twitter. *Journal of Teacher Education 64*, 305-318.

[21] Alsaeed, S. A. [2016]. Difficulties to Use [Twitter] in the educational process from the perspective of social studies teachers in the State of Kuwait. *Universal Journal of Educational Research, 4*[3], 576-581.

[22] Alim, Sophia. [2017]. Understanding the Use of Twitter for Teaching Purposes in Saudi Arabian Universities. *International Journal of Web-Based Learning and Teaching Technologies*.

[23] O'Connor, S., Zhang, M., Honey, M., & Lee, J. J. (2021). Digital professionalism on social media: A narrative review of the medical, nursing, and allied health education

literature. *International journal of medical informatics, 153*, 104514. https://doi.org/10.1016/j.ijmedinf.2021.104514

[24] Lord, Gillian & Anderson, Lara. [2014]. Twitter as a tool to promote community among language teachers. 22. 187-212.

[25] Seaman, J., & Tinti-Kane, H. [2013, October]. Social media for teaching and learning [online].

[26] Peddinti, S. T., Ross, K. W., & Cappos, J. [2016]. Finding sensitive accounts on Twitter: An automated approach based on follower anonymity. In *Proceedings of the 10th International Conference on Web and Social Media, ICWSM 2016* [pp. 655-658]. AAAI Press.

[27] Kabakus, Talha & Kara, Resul. [2017]. A survey of spam detection methods on twitter. *International Journal of Advanced Computer Science and Applications. 8..* 10.14569/IJACSA.2017.080305.

[28] Grosseck, G., & Holotescu, C. [2008]. Can we use twitter for educational activities? the 4th international scientific conference else: elearning and software for education. Retrieved                    from http://portaldoprofessor.mec.gov.br/storage/materiais/00000 12008.pdf

[29] Al-Khalifa, H. S. [2015]. On the analysis of twitter spam accounts in Saudi Arabia. *International Journal of Technology Diffusion [IJTD], 6*[1], 46-60.

[30] Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: SAGE Publications.

[31] Marín, V. I., & Tur, G. [2014]. Student teachers' attitude towards twitter for educational aims. *Open Praxis, 6*[3], 275-285.

[32] Ross, H. M., Banow, R., & Yu, S. [2015]. The use of twitter in large lecture courses: do the students see a benefit? *Contemporary Educational Technology, 6*[2], 126-139.

[33] Awaj, Omaya & Tibri, Samia (2016). The role of social networking sites in supporting distance education for university students. A research paper presented to the 11th International conference of the Generation Center for Scientific Research on Learning in the Age of Digital Technology, Tripoli, Lebanon, pp. 129-130.

[34] Moody, M. [2010]. Teaching Twitter and beyond: Tips for incorporating social media in traditional courses. *Journal of Magazine & New Media Research, 11[2]*, 1–9.

[35] Ibrahim, Khadiga (2014). The reality of using social networks in the educational process in the universities of Upper Egypt (a field study). *Educational Sciences, 3*(2).

[36] Global Media Insight (2021). Retrieved in July 2021 from: https://www.globalmediainsight.com/blog/saudi-arabia-social-media-statistics/

[37] Perveen, N., Missen, M., Rasool, Q., & Akhtar, N. (2016). "Sentiment based twitter spam detection" *International Journal of Advanced Computer Science and Applications[ijacsa], 7*[7], 2016.

[38] Abu Yaqoub, Shadan (2015). *The impact of social networking sites on the political awareness of the Palestinian cause among students of An-Najah National University* (Unpublished MA thesis). An-Najah University, Nablus, Palestine.

[39] Hamadneh, Mounis & Al-Shawaheen, Suzanne (2017). Attitudes of mathematics teachers in Jordan towards the use of the social networking site (Facebook) in teaching mathematics. *Al-Quds Open University Journal for Educational and Psychological Research and Studies, 5*(18).

[40] Alawneh, Hatem Suleiman (2013). The role of social networking sites in motivating Jordanian citizens to participate in the mass movement: A field study on trade unionists in Irbid. *Journal of the Association of Arab Universities for Literature,10*(1), 667-707.

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