

Do years of teaching experience make a difference for teachers working in Abu Dhabi government schools?

Martina Dickson*, Emirates College for Advanced Education, Abu Dhabi, United Arab Emirates

Melissa McMinn, Higher Colleges of Technology, Abu Dhabi, United Arab Emirates

Hanadi Kadbey, Emirates College for Advanced Education, Abu Dhabi, United Arab Emirates

Suggested Citation:

Dickson, M., McMinn, M. & Kadbey, H. (2019). Do years of teaching experience make a difference for teachers working in Abu Dhabi government schools?. *Cypriot Journal of Educational Science*. 14(4), 471–481. <https://doi.org/10.18844/cjes.v11i4.347>

Received August 15, 2019; revised from October 20, 2019; accepted from December 1, 2019.

©2019 United World Center of Research Innovation and Publication. All rights reserved.

Abstract

In Abu Dhabi, the capital of the United Arab Emirates, subject teachers of English medium in government schools are recruited from overseas and have a wide range of years of teaching experience. Research is divided into whether or not years of experience necessarily translates into a positive correlation with student-centred classroom practice such as the use of hands-on learning and inquiry-based approaches to learning in science. Abu Dhabi is in the process of dramatically overturning its education system, resulting in at times challenging teaching environments. Teachers working here are in the unique situation of being part of a rapidly developing education system and face similar challenges regardless of their years of experiences. This study surveys 249 expatriate English medium teachers to explore how their number of years of experience varies with their classroom practice, teaching beliefs and confidence levels. Although teachers with more experience were far more likely to express confidence in their own abilities (self-efficacies), we found the classroom practices of those between five and ten years of experience aligned most closely with inquiry-based, student-centred learning approaches applied in Abu Dhabi classrooms.

Keywords: Years' teaching experience, classroom practice, reform.

* ADDRESS FOR CORRESPONDENCE: **Martina Dickson**, Emirates College for Advanced Education, Abu Dhabi, United Arab Emirates. E-mail address: mdickson@ecae.ac.ae

1. Introduction

Abu Dhabi, the capital emirate of the United Arab Emirates (UAE), has been undergoing major educational reform since 2006. In later years, one of the strategies of this reform has been to staff government primary schools with English Medium Teachers (EMTs) to teach the subjects of Science, Maths and English. These teachers are recruited from chiefly Western countries with purportedly established education systems. In theory, they bring with them a wide range of experiences from their home countries and the group itself is fairly diverse. This article looks at whether their years of teaching experience correlate with their perceptions, beliefs and classroom practices of science education.

1.1. Literature review: How do years of experience affect teachers' beliefs and classroom practice?

Research is divided as to whether or not teachers' years of experience affect their beliefs and classroom practices. We will briefly attempt to summarise research which suggests a positive correlation between these, and that which suggests there is no or little correlation between the two, or that this correlation exists only for a limited period.

In their study of 195 teachers over a period of 13 years, Marsh (2007) analysed student evaluations for changes corresponding to the teachers' years of experience. They found little evidence that teachers' effectiveness (indicated by the student evaluations) varied with increasing numbers of years of experience. Klassen and Chiu (2010) examined relationships between years of teaching experience with factors such as the use of instructional strategies, student engagement and classroom management. They concluded that the hypothesis that a positive, linear relationship between experience and these factors was only true for a period of time between early and mid-career, after which the reverse was true and the relationship became nonlinear.

However, Huberman's (1989) recent famous study looking at the professional life cycle of teachers postulates that the mid-career (4–7 years) is the stabilisation period, whereupon teachers will either settle into their career having decided it is for them or leave. Beyond that is the middle year period (7–18) whereby teachers may consider their career choices. Later, we will see that, interestingly, most of the women in our studies would appear to fall into this group. It has been shown that teachers sometimes begin to reach out for help after the first year or two years of teaching, rather than during, simply because they are able to take stock of their teaching a little at this stage, past the frenzy and challenges of the novice years. This may also occur possibly because of a desire to update their skills, or because the freshness of the skills acquired during teacher-training begins to fade (Greenwood, 2003). Greenwood recounts how one of the teachers in her study began to "thirst for assistance in his practice" (p. 232) and suggests that perhaps methodology instruction should come at a later stage in the form of school-based coaching and mentoring programs when other skills are acquired, and not purely as part of pre-service training.

Other authors have come up with interesting findings in relation to the gains in a teachers' years of experience such as that more experienced teachers are more likely to trust their students and hold beliefs such as the inherent one that schools act as change agents (Brousseau, Book & Byers, 1998). They also found, however, that teachers' efficacy actually decreased as their classroom teaching experience increased. The results of their comparative study of experienced and inexperienced teachers suggested that "the experience of working in and being responsible for one's own classroom has a measurable impact on the individual beliefs" (p. 38). Additionally, no differences in teacher beliefs were observed between teachers with fewer than 10 and more than 10 years of experience. There were some differences in the groups in pedagogy styles with the more experienced group of teachers more likely to favour whole class instruction than small group instruction (which would be considered a more instructivist approach to teaching). They also found that more experienced teachers were less likely to believe that their own efforts positively affected students' education.

Friedrichsen et al. (2009) studied a mixed group of teachers, some with considerable prior teaching experience and some without. They found no difference in the pedagogy, lesson plans or perspectives; both groups held extremely didactic teaching orientations. Mastrilli (1997) showed that knowledge of instructional strategies is not necessarily a variable of years of teaching experience and in fact showed that for some teachers, the opposite held true.

Velthuis, Fisser and Pieters (2014) found that PSTs' experience of science teaching in primary schools was associated with increased self-efficacy, but the same effect was not observed on a wider scale for years of teaching experience post-training. In 1960, New York researchers Rabinowitz and Rosenbaum asked the question "what happens to a teacher's feelings about children and their education after they have taught for several years" (p. 313). For the teachers in their study, the answer to this was that unfortunately, teachers appeared to become cynical with displays of bitterness, distrust and even aggression. With years of experience, teachers placed more emphasis on orderly classrooms and less on student freedom. One of the interpretations with Rabinowitz and Rosenbaum offer for this is that their positive and favourable attitudes have been eroded by their years in the classroom. This would reflect the same return of experienced teachers to instructivist methods, which Brousseau et al. (1998) would find almost 40 years later.

Others have found that not only can attitudes and outlook be negatively related to years of experience but content and pedagogical content knowledge can also become eroded with the years. Hill, Rowan and Ball (2005) found no noted correlation between teacher experience and their content knowledge for teaching in Grade 1 teachers. An Iranian study found that pedagogical content knowledge was the highest among teachers with less than 10 years of experience and the lowest among those between 21 and 30 years of experience, thereby not meeting the "natural expectation of holding a positive correlation between teaching experience and professionalism" (Asl, Asl & Asl, 2014, p. 1605). On the other hand, one study from the U.S. showed that teachers' experience was positively linked with student achievement, particularly in Maths (Clotfelter, Ladd & Vigdor, 2007). Other studies have shown that not only some aspects of teachers' sense of efficacy were greater for those with more teaching experience (Wolters and Daugherty, 2007) but teaching experience was also linked to student achievement, especially in the first few years of teaching. This is a similar finding to that of Hanushek, Kain, O'Brien and Rivkin (2005). Wolters and Daugherty concluded that teachers with more experience were, quite simply, more effective than those less experienced. They ask rhetorically whether this could partly be due to a higher rate of attrition for poorer quality teachers, not simply that teachers became more effective as they gained experience, i.e., that the better quality teachers chose to stay behind and this is why their students do better.

1.2. The role of EMTs in schools in Abu Dhabi

EMTs in Abu Dhabi government schools are responsible for the planning and teaching of Science, Maths and English in primary schools (Grades 1–5). At the original inception of the recruitment of EMTs, they were to replace either Emirati or Arab teachers from non-Gulf countries to teach these subjects. They were also the first generalist teachers Abu Dhabi government schools had ever had, since prior to this, English, Maths and Science were taught by specialist teachers from Grade 4 onwards. 2010 saw the roll-out of the new Abu Dhabi Educational Council (ADEC) standards known as the New School Model (NSM).

EMTs had to be well versed in the NSM and able to facilitate this roll-out. This was by no means an easy task. Schools were in a period of rapid transition following a public–private partnership whereupon private consultancy companies would advise schools on various aspects, including pedagogy and school leadership, to varying degrees of success (Crabtree, 2010; Thorne, 2010). As a result, schools may have been less welcoming and perhaps more cynical to further changes by the time of the EMTs' arrival. Schools at the time complained of a lack of resources and training to enable them to implement the NSM effectively. It was, and still is to some extent, arguably a tumultuous time in government schools in Abu Dhabi and certainly a time which would stretch EMTs to their limits,

testing not only teaching abilities but also tenacity, perseverance and ability to cope with change and pressure, at times under limited capacity and support in terms of resources for the newly rolled out curriculum. ADEC, recruiting thousands of EMTs under the duress of a highly pressured and time-sensitive set of aims and goals, required a minimum of only two years of teaching experience in addition to a recognised teaching qualification. This resulted in an extremely diverse age range of recruited teachers.

This article is concerned with the study of whether this variation in years of experience correlated with the teachers' beliefs and classroom practices in science (a subject which, by most reckonings, should be taught in a hands-on and student-centred fashion and is, therefore, a good indicator of a teacher's leanings towards these methods). This concept is provided by the theoretical framework which our literature review provides, some of which suggest that teachers with a greater number of years of experience are more likely to fall back upon instructivist methods, yet more able to cope with factors such as classroom management, changes and conflict resolution. It might be hypothesised, then, that EMTs who have a larger number of years of teaching experience might be better able to cope with the tumult of the educational reform, the rapidly developing system where things change on a yearly basis, improvise with a lack of resources, etc. while maintaining the standards of teaching which in theory they should have demonstrated in their home countries prior to recruitment to Abu Dhabi.

1.3. Research questions

This study sought to research the following questions:

- Is there a difference between the stated confidence levels of teachers across ranges of years of teaching experience?
- Is the relationship between years of teaching experience and stated classroom practice one of significance?
- Do beliefs about how children best learn vary among groups of teachers with differing years of experience?

2. Methodology

2.1. Participants

Prior to beginning the study, ethical approval was gained from the schools' educational council governing body. The data collection tool (survey questionnaire) was circulated to the principals of 60 public schools in Abu Dhabi. They were requested to forward this to the EMTs in their school. Since the survey was anonymous, we are unable to check the precise number of schools who chose to take part in the study, but we know that 249 teachers responded. All are female due to a feminisation policy which primary schools in Abu Dhabi subscribe to. At a very rough estimate, a primary school might typically employ between 8 and 10 EMTs, so by this estimate, the survey response rate falls within the range of 40%–60% which could be considered a fairly healthy response rate (Dommeyer, Baum, Hanna & Chapman, 2004). Embedded at the beginning of the survey was a section on the ethics of the study emphasising its voluntary and anonymous nature, and that the participant had the right to withdraw at any time without consequence.

2.2. Research design

A quantitative method research design was adopted. The survey questionnaire contained Likert Scale questions with the items in the survey questionnaire were selected by means of a careful process of selection and successive rounds of elimination, which would enable teachers' perceptions and beliefs to be explored in order to provide a background for the classroom practices which they

would be asked to describe the closest agreement with. A pilot survey was carried out on two teachers who would not take part in the survey. The validity of the survey questionnaire was increased by making adjustments that were made in response to the feedback regarding problematic or unclear questions. Each question was carefully selected and studied for its close relevance to research questions, and any with questionable linkage were either modified or disregarded. ADEC standards descriptors were closely leaned towards items regarding inquiry approaches to learning in order to provide a robust framework for our questions. This was important since all of the teachers in the study work in ADEC government schools. These relate to collaborative learning opportunities, allowing students to think, create questions and explore ideas without teacher interjection.

The survey comprised four sections, one relating to some basic demographic information such as number of years of teaching experience, along with nationality of the teacher carrying out the survey (specifically, Emirati versus non-Emirati). The second section asks teachers to rate their confidence level using a four-point Likert Scale ranging from not confident at all to extremely confident. Third, teachers were asked about their practices in the classroom using benchmarked international practices to see how often they were likely to do these things, and finally, a series of statements on “how children learn science best” which was accompanied by another four-point Likert scale; this time (strongly disagree/disagree/agree/strongly agree). Data were analysed using Excel Statistics Toolbox™ for both descriptive statistics such as mean scores, and then data analysed for statistical significance *t*-tests.

3. Results

3.1. Years of experience

We learned from our initial demographic survey questions that the EMTs in our sample had a wide range of years of teaching experience with close to half of the sample having more than 10 years of experience (see Table 1). The very small percentage of teachers with less than 2 years of teaching experience was an anomaly in the sample and we excluded them from the statistical analysis. We had also asked teachers to identify themselves as non-Emirati or Emirati so as to exclude Emirati teachers from the survey for the purposes of the particular focus of this article, i.e., years of experience of teachers trained overseas.

Table 1. Teachers’ number of years of experience

Years of teaching experience	% of Sample	Number
Less than 2 years	2	5
Between 2 and 5 years	15	37
Between 5 and 10 years	34	84
More than 10 years	49	122
		Total: 248

3.2. Teaching and learning beliefs

Table 2 illustrates that the means for the belief statements are similar across the ranges of experience. The difference is only statistically significant for one of the statements, i.e., that ‘students understand science best when they discuss concepts with their partners’ between those with five to ten years, and greater than 10 years of experience. The mean for this statement is greater for those with more than 10 years of experience, perhaps reflecting teachers having seen this occurrence in their classes over numerous years and observing the benefits of having students discuss scientific concepts. However, the same significance is not observed between the least experienced (2–4 years) and most experienced (greater than 10 years). Overall, there appeared to be no statistically significant variation in agreement with belief statements for teachers’ range of experience; in other words,

teachers with greater years of experience hold similar beliefs to those with only a few years of experiences.

Table 2. The variation in beliefs with years of teaching experience

Belief statements	Mean scores for varying years of teaching experience (1 = Strongly disagree, 4 = Strongly agree)			t-test between teachers with 2–5 years, and 5–10 years experience	t-test between teachers with 5–10 years, and >10 years experience	t-test between teachers with 2–5 years, and >10 years experience
	2–5 years n = 37	5–10 years n = 84	>10 years n = 122			
Students learn science more effectively when they work in groups and share ideas.	3.44	3.22	3.44	0.23	0.95	0.80
Students understand science best when they discuss concepts with their partners.	3.33	3.22	3.36	0.3	0.05	0.78
Students' interest in learning science increases when they pose their own questions and discover the answers by themselves.	3.17	3.32	3.36	0.19	0.73	0.12
Students remember a scientific fact when they discover it by exploring and observing by themselves rather than when they hear about it from their teacher.	3.22	3.42	3.38	0.14	0.65	0.20
Students broaden their scientific inquiry skills by communicating, sharing and reviewing each other's results.	3.28	3.33	3.33	0.65	1	0.63
Students understand scientific concepts better when they are given time to think before answering questions in class and time to reflect on their learning.	3.44	3.42	3.43	0.80	0.92	0.87

3.3. Classroom practice

Teachers' agreement with statements of their classroom practice is shown in Table 3. These statements relate closely to ADEC's NSM, and other documentation of best-accepted practice in the science classroom. They have been carefully written so that a high mean score correlates to a high degree of student-centred learning, as all of the statements lean towards this philosophy. For all statements, the highest means were from the teachers' responses between five and ten years of experience. It may be surprising, perhaps, that those with more than 10 years of experience are less student-centred than those with less experience, but in fact, this is in keeping with Rabinowitz and Rosenbaum (1960) who found that some teachers reportedly become jaded as they remain in the profession. Perhaps those with the middle levels of experience can be thought of as having gained enough confidence and experience to know what they would like to be doing, and to put these into practice in the classroom while retaining the freshness and enthusiasm for teaching which some of their older colleagues may lose. Certain statements show statistically significant differences, such as for engaging students in hands-on or inquiry science. For this statement, those with 5–10 years of experience respond significantly differently from those with greater than 10 years of experience. Once more, teachers with 5–10 years of experience seem to be the most likely to be using the hands-on approach which ADEC's NSM embodies. This group is also the most likely to utilise integration between Maths, English and Science showing these connections. These responses are significantly different from the least experienced group (between 2 and 5 years). Mastrilli (1997) also showed that knowledge of instructional strategies is not necessarily a variable of years of teaching experience and in fact showed that for some, the opposite held true.

Table 3. Teachers' reported classroom practices

Statement of classroom practice	Often or Always (%) Years of Teaching Experience			t-test between teachers with 2–5, and 5–10 years experience	t-test between teachers with 5–10, and >10 years experience	t-test between teachers with 2–5, and >10 years experience
	2–5 (n = 38)	5–10 (n = 86)	>10 (n = 86)			
1. I allow my students to explore and discover science concepts on their own with minimal teacher input.	8	15	21	0.43	0.49	0.17
I involve students in class debates and discussions.	55	43	55	0.67	0.43	0.82
I actively involve students in hands-on activities and investigations.	57	71	51	0.08	0.0038	0.77
I provide opportunities for students to work in pairs or very small groups	71	74	73	0.97	0.94	0.93
I incorporate scientific inquiry skills in my science classes.	47	62	55	0.14	0.15	0.70
I encourage collaborative learning among my students	79	83	74	0.83	0.30	0.57
I use ICT tools in my science class.	47	61	57	0.35	0.39	0.79
I arrange library lessons and field trips connected to the science topics	5	9	7	0.39	0.99	0.39

I relate science concepts studied in class to our daily life and to the real world.	68	78	79	0.17	0.35	0.52
I create differentiated resources to support student learning in science	26	49	44	0.12	0.73	0.24
I create differentiated activities and experiments to support student learning in science	29	49	38	0.31	0.28	0.88
I use different science assessment tools, not only projects and exams.	55	58	57	0.85	0.95	0.88
I help my students to make connections between Science, Maths and English.	66	80	72	0.05	0.25	0.36

3.4. Confidence levels

The statements illustrated in Table 4 reflect the confidence expressed in the four content areas of their teaching (loosely responding to physics, biology, geology and chemistry) as well as the skill areas. The means for the three ranges of experience correspond perfectly, as seen in Table 3; as the years of experience increase, the mean values for confidence increase for all statements. Although some of these increments are decidedly small, as a pattern the trend is undeniable. Every single one of these statements holds a statistically significant difference between the ranges of least and most number of years of experience (2–5, and >10 years). A few of the statements of confidence in content are also statistically significant for teachers between 2–5 and 5–10 years of experience too. What is clear from these results is that unequivocally, the teachers with the most experience profess to be the most confident teachers in the sample, in both content and skill areas. Those teachers with only 2–5 years of experience are the least confident. Although this might seem predictable, this needs to be taken into the context of all teachers being expatriate, and likely recent ones too, so it seems that although the context is new to all, the more experienced teachers have a greater confidence in any case.

Table 4. Teachers' confidence in their own science teaching (self-efficacy)

Statements	Mean Confidence Levels (4 max)			t-test	t-test	t-test
	2–5 (n = 38)	5–10 (n = 86)	>10 (n = 86)	between teachers with 2–5, and 5–10 years experience	between teachers with 5–10, and >10 years experience	between teachers with 2–5, and >10 years experience
Teaching the content and developing activities for the ADEC strand 'Living World'	2.95	3.26	3.33	0.039	0.67	0.0087
Teaching the content and developing activities for the ADEC strand 'Physical World'	2.78	3.07	3.2	0.056	0.49	0.007
Teaching the content and	2.86	3.1	3.21	0.153	0.55	0.05

developing activities for the ADEC strand 'Earth and Space'						
Teaching the content and developing activities for the ADEC strand 'Matter	2.75	3.02	3.17	0.14	0.22	0.02
Providing hands-on opportunities for learning in science	2.67	2.79	3.08	0.55	0.02	0.02
Providing differentiated activities and experiments for students in science	2.37	2.60	2.77	0.21	0.21	0.03
Providing a learning experience in science which is primarily student-centred	2.53	2.81	2.97	0.11	0.26	0.01
Teaching science inquiry skills	2.46	2.67	3.06	0.22	0.004	0.0005

4. Discussion and conclusion

Obviously, a limitation of a study such as this one is in the nature of self-reported data, i.e., one's perceptions, and reported practices, do not necessarily correlate to actual classroom practice. Nonetheless, the data do give us important indicators of likely trends that can be explored further.

Similar to previous studies mentioned earlier, confidence levels are the greatest among those teachers with the most experience. This suggests that this relationship withstands even a move to a new country, context and teaching in challenging environments. Confidence levels are the least among those with the least experience. Whether this is because they simply lack experience, or because their new school setting is simply overwhelming, is unclear. Huberman (1989) also identified the older group of teachers in his study as being the most serene and confident, but this age range was even older (19–30 years) while we designed the range stated as being > 10 years. In hindsight, breaking this down even further would have been beneficial and given us even more information about the teachers.

What is clear from these results is that unequivocally, the teachers with the most experience profess to be the most confident teachers in the sample in both content and skill areas. Those teachers with only 2–5 years of experience are the least confident as might be expected.

No differences were noted in belief statements among the ranges of years of experience. In other words, teachers with a large number of years of experience hold similar beliefs to those with only a few years of experiences. This aligns with Brousseau et al. (1998), who also found no differences in beliefs held between teachers with fewer than and more than 10 years of experience. If teachers across the experience range hold similar 'best practice' beliefs about how children best learn science, this may be a product of pre-service training in their home countries. This may well justify the employment of Western-trained teachers as their self-reported beliefs align well with ADEC's philosophy on science education.

However, critically, this does not match with the reported classroom practices in this study. Reported classroom practice appears to be the most closely aligned with student-centred methodology (and therefore, ADEC's NSM) for those teachers between 5 and 10 years. Least aligned were teachers who were greater than 10 years of experience. In other words, teachers with more than

10 years of experience were more likely to use teacher-centered strategies despite holding similar beliefs to their less experienced counterparts who were using student-centred approaches. Certain statements show statistically significant differences, such as for engaging students in hands-on or inquiry-based approaches to science. For these statements, those with 5–10 years of experience respond significantly differently to those with greater than 10 years of experience, in other words those with 5–10 years of experience scoring the highest means and being the most likely to be using the hands-on approach, which ADEC's model embodies.

Teachers with more than 10 years of experience are less likely than those with 5–10 years to utilise integration between Maths, English and Science, which is an important pedagogical concept. Since we have not studied how these affect student attainment of learning outcomes, we can only surmise that the teachers are not adhering as closely to the NSM as the other groups, not whether or not this is effective.

5. Recommendations

Greenwood (2003) suggested that in-service teachers would benefit greatly from methodology coaching and mentoring later on, once they have navigated their way through the first two years of novice teaching. The data from our study would suggest that teachers with 2–5 years of experience could benefit from this. Likewise, they would benefit from professional development workshops in content and skills teaching as they are least confident, and perhaps some of this could be carried out by those peers with more experience. Since ADEC employs teachers within this range of years of teaching experience, yet we have seen that significant differences exist between the groups, it would make sense to incorporate these findings into in-service training plans. Those with 5–10 years of experience profess to practice student-centred methodology most often.

More research needs to be undertaken to triangulate these findings with classroom observations to study the correlation between reported classroom practice and actual classroom practice. If these data were triangulated and found to be matching with observed classroom practice, then student-centred methodology professional development could be carried out by these teachers. Given that classroom practice is ultimately the most important factor to consider from the three discussed here (beliefs, confidence and practice), a further recommendation might be that recruitment of new teachers could align with the findings that the optimum number of years of teaching experience for new recruits would be between 5 and 10 years.

References

- Asl, E. S., Asl, N. S. & Asl, S. A. (2014). The erosion of EFL teachers' content and pedagogical content knowledge throughout the years of teaching experience. *Procedia – Social and Behavioural Sciences*, 98, 1599–1605.
- Brousseau, B. A., Book, C. & Byers, J. L. (1998). Teacher beliefs and the cultures of teaching. *Journal of Teacher Education*, 39(6), 33–39.
- Clotfelter, C. T., Ladd, H. F. & Vigdor, J. L. (2007). *How and why do teacher credentials matter for student achievement?* National Centre for Analysis of Longitudinal Data in Education Research (CALDER), Working Paper No. 2. Urban Institute, Duke University.
- Crabtree, S. A. (2010). Engaging students from the United Arab Emirates in culturally responsive education. *Innovations in Education and Teaching International*, 47(1), 85–94.
- Dommeier, C. J., Baum, P., Hanna, R. W. & Chapman, K. S. (2004). Gathering faculty teaching evaluations by in-class and online surveys: their effects on response rates and evaluations. *Assessment & Evaluation in Higher Education*, 29(5), 611–623.
- Friedrichsen, P. J., Abell, S. K., Pareja, E. M. Brown, P. L., Lankford, D. M. & Volkmann, M. J. (2009). Does teaching experience matter? Examining biology teachers' prior knowledge for teaching in an alternative certification program. *Journal of Research in Science Teaching*, 46(4), 357–383.

Dickson, M., McMinn, M. & Kadbey, H. (2019). Do years of teaching experience make a difference for teachers working in Abu Dhabi government schools?. *Cypriot Journal of Educational Science*, 14(4), 471-481. <https://doi.org/10.18844/cjes.v11i4.347>

- Greenwood, A. M. (2003). Factors influencing the development of career-change teachers' science teaching orientation. *Journal of Science Teacher Education*, 14(3), 217–234.
- Hanushek, E. A., Kain, J. F., O'Brien, D. M. & Rivkin, S. G. (2005). *The market for teacher quality* (Unpublished Paper). Stanford, CA: Stanford University.
- Hill, C., Rowan, B. & Ball, D. L. (2005). Effects of teachers' mathematical knowledge for teaching on student achievement. *American Educational Research Journal*, 42(2), 371–406.
- Huberman, M. (1989). The professional life cycle of teachers. *Teachers College Record*, 91, 31–57.
- Klassen, R. M. & Chiu, M. M. (2010). *Effects on teachers' self-efficacy and job satisfaction: teacher gender, years of experience and job stress*. *Journal of Educational Psychology*, 102(3), 741–756.
- Marsh, H. W. (2007). Do university teachers become more effective with experience? A multilevel growth model of students' evaluations of teaching over 13 years. *Journal of Educational Psychology*, 99(4), 775–790.
- Mastrilli, T. M. (1997). Instructional analogies used by biology teachers: implications for practice and teacher preparation. *Journal of Science Teacher Education*, 8, 187–204.
- Rabinowitz, W. & Rosenbaum, I. (1960). Teaching experience and teachers' attitudes. *The Elementary School Journal*, 60(6), 313–319.
- Thorne, C. (2010). The impact of educational reforms on the work of the school principal in the United Arab Emirates. *Educational Management, Administration & Leadership*, 39(2), 172–185.
- Velthuis, C., Fisser, P. & Pieters, J. (2014). Teacher training and pre-service primary teachers' self-efficacy for science teaching. *Journal of Science Teacher Education*, 25, 445–464.
- Wolters, C. A. & Daugherty, S. G. (2007). Goal structures and teachers' sense of efficacy: their relation and association to teaching experience and academic level. *Journal of Educational Psychology*, 99(1), 181–193.