

Translating Bloom's Taxonomy Action Verb List into Arabic for Teacher Preparation Programs: Challenges/Problems and Solutions

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ABSTRACT

This paper presents a unified Arabic version of the English action verbs mentioned in Bloom's taxonomy (1956) that has been checked for validity and reliability by a panel of education experts. Methodologically, the Bloom's list of action verbs was first translated into Arabic by an expert professor of translation. Then, using a mixed-method approach the Arabic list was validated by three bilingual education experts working at universities in Bahrain, Qatar, and the United Arab Emirates. As part of the process, the paper established a single Bloom's taxonomy list of action verbs, based on the data provided by two reputable educational institutions that were cross-checked with a well-referenced textbook. A contextualized Arabic translation of the list was then produced and was subjected to rigorous checks by a panel of reviewers who were the education experts. The paper presents the challenges faced in translating the list into Arabic and the solutions we have adopted as well as the validity and reliability checks. The implication of this paper is in offering teacher preparation programs across the Arab world an Arabic Bloom's taxonomy list that can be used by in-service and pre-service teachers. Moreover, it contributes to teacher literacy in the correct use of Bloom's action verbs in the Arabic language.

Key words: Bloom's Taxonomy, Arabic, Translation, Teacher Literacy, Reliability, Validity

INTRODUCTION

In our previous work we stressed on the need to unify Bloom's taxonomy action verbs for use by pre-service and in-service teachers across Arab teacher preparation colleges (ElJishi & Abdel-Hameed, 2022). The need for this project comes from the confusion pre-service and in-service teachers have in using Bloom's taxonomy that is found primarily in English and having to translate the English action verbs into Arabic; say for use in their lesson plans. The teachers either must translate the verbs themselves or rely on online translation applications. The result is lack of validity and reliability in the translated action verbs that are being used. This also makes it difficult for faculty instructing in teacher preparation programs to assess the work of their student teachers as there is no one correct list to compare to. In this paper we present the translated Bloom's taxonomy list in Arabic and discuss the steps we took to arrive at the unified list that has validity and reliability. The aim of this paper is to offer a Bloom's taxonomy list in Arabic that can be used by faculty and student-teachers in teacher preparation programs across the Arab world. In this paper we will present the relevant literature review, discuss our methodology, discuss our findings, and finally present the Arabic Bloom's list we produced. This work will improve teacher literacy overall in the correct use of the Arabic translated Bloom's taxonomy.

By improving teacher literacy, we mean the correct use of Bloom's taxonomy action verbs in the Arabic language where teachers will have a list of translated action verbs to choose from identified by the appropriate cognitive level. The list will provide teachers with a reference list that has been checked by the faculty of teacher preparation programs for validity and reliability. This will allow teachers to write their learning objectives and prepare their lesson plans with convenience and uniformity, using the right action verb for the corresponding cognitive level with the correct contextualized translation of the action verbs. Overall, we expect this will contribute to improving the teachers' Arabic literacy in the appropriate use of Bloom's taxonomy action verbs.

LITERATURE REVIEW

Bloom's taxonomy is a widely used hierarchy that aligns both curriculum and assessment goals as it describes learning objectives in terms of explicit and implicit cognitive skills and abilities (Das et al., 2021; Lee et al., 2015). The Taxonomy was originally developed by Benjamin Bloom in 1956 (Bloom et al., 1956) and went through a major revision in 2001 by Anderson et al. (2001). The taxonomy claims that human thinking can be classified into six different levels:

remembering, understanding, applying, analyzing, evaluating, and creating.

These levels are ordered in increasingly complex cognitive functions where the first three levels stimulate lower thinking skills while the other four promote higher order thinking abilities. Consequently, learning activities should expose students to the different six levels for them to learn more effectively and become critical thinkers (Meda & Swart, 2017).

The hierarchical categorizations of the original taxonomy were found to be rigid due to the difficulties associated with coding its cognitive levels and thus was modified to overcome such difficulties. To make learning and assessment activities easier to design, major modifications were introduced in the revised version that included changing the names of the levels where evaluation becomes creating, synthesis becomes evaluating, comprehension becomes understanding and knowledge becomes remembering (Anderson et al., 2001; Green, 2010). In addition, to describe the cognitive processes with greater clarity, the revised taxonomy associates each cognitive level with certain verbs that show the action that a student is expected to demonstrate, thus helping teachers and educators to write learning outcomes that can be easily observed and measured (Biggs, 2012).

In the Arab world context, a study conducted to investigate the role of Bloom's taxonomy in the development of the vocabulary and critical thinking competences of 30 Moroccan primary school English learners, found that the more the students at primary level are exposed to questions on the Bloom scale the better they perform in their language classes in terms of their vocabulary and analytical discourse and critical thinking skills (Benjelloun & El Allame, 2019).

Hussain (2009) argued that a similar hierarchical categorization of Bloom's taxonomy is deeply rooted and compatible with the religious teachings and culture of Islam, especially in terms of progressing through the different thinking levels in the affective and psychomotor domains.

Next, studies that were conducted in other Arab countries showed that in practice there is a heavy emphasis on lower order thinking skills rather than higher order thinking skills when designing curriculum and learning goals. For example, a study that was conducted in the West Bank by Darwazeh (2011) and included over 400 teachers showed that 80% of those teachers implemented the Bloom taxonomy when planning and executing the learning and teaching activities of their lessons. However, around 83% of those activities focused primarily on the lower thinking skills (remembering and understanding). Another study by Darwish and Al-Saqa (2011) analyzed the math and statistics curriculum in Syrian secondary schools and concluded that only around 14% of its learning goals promoted higher order thinking skills. Consequently, this contributed to lower student motivation and lower student achievement in the subject. A similar study that included 13 Arab high school English teachers in 9 different schools with a majority of Arab students in the northern and southern regions of 48 Palestine, illustrated that most of the questions posed by those teachers in the reading comprehension classes promoted students' lower thinking skills (Assaly & Jabarin, 2021). Likewise, these findings in the Arab region are in line with

the conclusions of similar studies elsewhere that indicated that teachers tend to emphasize lower thinking skills when designing learning objectives and assessment questions (Jones et al., 2009; Swart & Daneti, 2019).

Teachers in the Arab countries and in other countries alike indicated that there are several internal and external challenges that hinder the implementation of higher order thinking skills in their classrooms. Firstly, it has been reported that teachers' lack of knowledge, expertise, and training about the use of higher order thinking skills negatively impact their ability to formulate questions and tasks that measure such skills (Ardini, 2017; Assaly & Jabarin, 2021; Wilson & Narasuman, 2020). In addition, the variances in students' abilities and academic performance force teachers to only use higher order thinking skills with higher performing students (Ardini, 2017; Assaly & Jabarin, 2021; Wilson & Narasuman, 2020). The other challenges are more related to external factors that teachers have little control over, such as the learning environment, over-crowded classes, and the lack of teaching aids and resources that support the integration of higher order thinking skills in classroom activities (Assaly & Jabarin, 2021; Seif, 2017; Wilson & Narasuman, 2020). A main reason can also be attributed to cultural norms such as the lack of parents' awareness about the importance of such skills and their emphasis for their children to get high grades regardless of how they learn (Assaly & Jabarin, 2021).

On the other hand, one major criticism for both the original and the revised versions was that some of its action verbs can be associated with more than one level, causing an ambiguity about the actual meaning of each cognitive level (Das et al., 2021). In other words, the lack of consistency in how the existing Bloom taxonomy lists align verbs with levels of thinking makes it hard to gauge and differentiate between the exact nature of the achieved learning outcomes in different educational settings (Stanny, 2016). This is mainly due to the flexible nature of language, for example a verb can be associated with both low and high Bloom levels depending on the context in which it is used in (Stanny, 2016). Hence, it is crucial to understand the context in which each verb is used, otherwise its exact meaning will remain ambiguous. Moreover, this kind of ambiguity becomes even worse when translating the action verbs lists into other languages, taking in account the cultural and social characteristics that are unique to each context (ElJishi & Abdel-Hameed, 2022). Soozandehfar and Adeli (2016) further clarified that the teaching and learning processes are not only comprised of thinking, but these processes are also shaped and determined by the feelings and beliefs of students and teachers and the wider social and cultural environments.

To reduce the existing ambiguity, there were several attempts to produce a unified action verb list for the different levels of the Bloom taxonomy. That is to say, the main rationale for producing such lists is to categorize verbs that are consistently aligning with specific levels of Bloom's Taxonomy, and such scaling down will in turn reduce the current ambiguity (Das et al., 2021). For example, Stanny (2016) analyzed 30 different compilations posted on the websites of several educational institutions and evaluated how well these verbs aligned with each category in Bloom's

taxonomy and provided a compilation of 176 action verbs. Furthermore, Das et al. (2021) produced another 153 unified Bloom's taxonomy action verbs list that is free from over-lapping in multiple cognitive levels and a separate compilation of 21 action verbs that showed transition from one level to another. In the Arab world there were attempts to translate the Bloom's taxonomy AlKhawaldah and Awda (Bloom et al., 2008); Al-Sanea, 2000; Tooq and Adulrahman (1984). However, there is still no single Arabic list of action verbs that can be used by educators and that is free of duplicated verbs that has been tested for validity and reliability (ElJishi & Abdel-Hameed, 2022).

As can be seen from the literature review, we have not found a Bloom's taxonomy list in Arabic that has been translated and tested thoroughly. That is why we believe our work will address a gap in the literature mainly to produce a list that has been translated by a professional professor of translation into Arabic and that has been reviewed by expert faculty in a teacher preparation program for validity and reliability. The produced list would make sure the Arabic action verbs used are translated accurately and that there are no crossover of action verbs from one Bloom's level to the other, valid and reliable making it easy to use by faculty and student teachers in teacher preparation programs across the Arab world.

METHODOLOGY

We began the project by identifying three top ranked universities in education worldwide. According to the Times Higher Education website (<https://www.timeshighereducation.com/world-university-rankings>) the top three ranked universities in education are:

1. Stanford University
2. University of California Berkeley
3. Harvard University

We obtained samples of Bloom's taxonomy lists using action verbs from the knowledge domain to unify into one single list. We eliminated the University of California at Berkeley list as it was using the old version of Bloom's taxonomy on its webpage. We then cross checked the Stanford and Harvard combined list of action verbs with a reference textbook (Zhou & Brown, 2015) that reported on the updated Bloom's taxonomy list of action verbs. For the action verb to be placed in the correct Bloom's cognitive level we went with the consensus of the referenced lists. So, if an action verb appeared in the remember level on the Stanford list and appeared on the analysis level for the Harvard list, we looked at the textbook reference. If the textbook reference placed the action verb in the analysis level, then we placed the action verb in the analysis level. If the three references placed the action verbs in three different levels, we eliminated that action verb from our Bloom's taxonomy list. At the end we obtained a unified list of English action verbs that had no repeating action verbs throughout the different Bloom's cognitive levels. This was important because if an action verb appeared in more than one Bloom's level this would lead to confusion on the part of the teachers who would not know where to place them in the Bloom's taxonomy levels.

Next, we sent our English language Bloom's taxonomy list to a translation expert who has over 40 years of translation experience as a translation college professor. Owing to the complexity of the Arabic language and the fact that English words may have many one-to-one equivalents in the Arabic language, a contextual translation was needed. The translator provided the translated Bloom's action verbs with an explanation which he placed in parenthesis. This would greatly help the student teacher to know the exact meaning of the Arabic translation and where in Bloom's levels to use it and how to use it for example in preparing their lesson plans. Last of all, the translation was done using the transliteration table listed in the appendix.

Last of all, the produced Arabic list of action verbs was checked by three expert faculty from differing Arab Gulf countries (Bahrain, Qatar, and United Arab Emirates) who were surveyed and interviewed to check the validity and reliability of the translated Arabic list. In this non-experimental research design the mixed methods approach surveyed and interviewed the three educational experts who taught at Arab Gulf universities in teacher preparation programs. Each of the experts had over 10 years of teaching experience using Bloom's taxonomy. The experts were asked to fill a two-part survey questionnaire. The first part asked the experts to place the different categories of Bloom's taxonomy in Arabic into the appropriate level. The second part asked the experts to critique the provided Arabic Bloom's taxonomy.

The experts blind reviewed the provided Arabic taxonomy and were not able to see one another's responses. Moreover, they were only given part two after successfully completing part one. To test for validity of the provided Bloom's taxonomy Arabic list the responses were compared to the target answer. To test for reliability the faculty responses to part 1 were compared for each of the faculty experts. Below we present our findings and the translated Arabic Bloom's taxonomy list. Each faculty was then interviewed to discuss their responses to the survey.

FINDINGS

The Arabic Translated Bloom's Taxonomy List

The combined English list of action verbs from Harvard, Stanford, and cross checked with (Zhou & Brown, 2015) can be found in Table 1. This list was given to the expert translator and the Arabic action verb equivalents are provided next to the English action verbs in the table. A discussion of the findings for the challenges in translating the action verbs and the solution adopted are provided in the section that follows.

To check the validity of the list being used by educational experts, the Arabic Bloom's taxonomy list was given to three faculty who each have over 10 years of teaching experience using Bloom's taxonomy in a teacher preparation college in the Arab Gulf. All three faculty have taught in three different teacher preparation colleges in Bahrain, Qatar, and the United Arab Emirates and were surveyed with a two-part questionnaire. In part 1 of the survey each faculty was asked to place the list of action verbs at the appropriate cognitive levels. All three faculty (100%) successfully placed the

Table 1. Bloom's taxonomy action verbs in English and Arabic (cognitive domain)

| | Action verbs | أفعال العمل |
|--------------------|---|--|
| Remember تذكر | Find, cite, locate, recall, highlight, retrieve, search, define, describe, label, list, match, name, reproduce, state | اعثر على، اذكر شواهد (استشهد)، حدّد موقع/مواقع أو مكان/أماكن، استذكر (المعلومات، المفاهيم، الأفكار، النظريات)، سلط الضوء على (النقاط المهمة)، استرد (البيانات/المعلومات من ذاكرتك)، فتنش، عرّف (بمعنى قم بتعريف)، أوص (اذكر أوصاف/توصيفات)، علم (بعلامة فارقة)، عدّد (قم بتعداد، أدرج بجدول، جدول)، قابل بين، سمّ/اذكر (أسماء، مؤشرات)، (استرجع (المعلومات)، أعد إنتاج، بيّن (بالتحديد |
| Understand افهم | Annotate, outline, compare, discuss, convert, explain, extend, generalize, exemplify (give an example), paraphrase, predict, summarize, translate, research, review, restate | قدّم شروحات على، اكتب الخطوط العريضة، قارن، ناقش، حوّل، اشرح، توسّع في، قم بتعميم، أعط مثالا، عبّر بطريقة أخرى، استشرّف، أوجز (اذكر بإيجاز)، انقل (الأفكار)/ترجم، استقص علمياً، يراجع، أعد القول (في صيغة جديدة) |
| Apply طبّق | Apply, articulate, calculate, choose, complete, execute, dramatize, practice, share, change, illustrate, operate, teach, examine, classify, compute, demonstrate, discover, manipulate, prepare, produce, relate, show, solve, use | طبّق، افصح (في الكلام/النطق)، احسب، انتق، أكمل، نفّد، ضع في قالب تمثيلي، تدرب، شارك (في)، غير (قم بتغيير)، وضّح (بالمثال)، شغّل (قم بتشغيل)، درّس/علم، تفحص، صنّف، خوسب، قدّم بالدليل، اكتشف، عالج، أعد/قم بإعداد، انتج، اربط، اظهر، حلّ/قدم حلاً، استخدم/استعمل |
| Analyze حلّل | Analyze, categorize, deduce, edit, investigate, reverse, select, separate, engineer, examine, establish, break down, conclude, diagram, deconstruct, differentiate, discriminate, distinguish, correlate, contrast | حلّل، افرز، استنبط، حرّر، تحقق، اعكس، اختر، افصل، قم بهندسة، تفحص، أسس، فصل، استنتج، ارسم بياناً، فكك البنية، فرّق، ميّز، اظهر التمايز، اربط العلاقة المتبادلة بين، ناظر |
| Evaluate قيّم | Argue, assess, collaborate, critique, debate, evaluate, hypothesize, judge, moderate, recommend, reflect, test, verify, prioritize, rate, inspect, decide, measure, appraise, conclude, criticize, defend, discriminates, justify, support | قدّم حججاً، ثمّن، بيّن محاسن ومساوئ/انتقد بموضوعية، حاور، قيّم، افترض، احكم، توسّط، زكّ/قدّم تزكية، امتحن، رتّب حسب الأولوية، اعط معدل، فتنش عن، قرّر، قيس/قم بقياس، احكم على (الموقف)، استنتج من التقييم، انتقد (بشأن المحاسن أو المساوئ)، دافع (بناء على التقييم)، اعرض بالتباين، برّر، ادعم |
| Create أبدع | Integrate, intervene, model, negotiate, plan, progress, rearrange, formulate, construct, reinforce, revise, structure, substitute, validate, assemble, develop, draft, invent, produce, propose, publish, repurpose, upload, write, synthesize, categorize, combine, compile, compose, create, devise, design, generate, organize, reconstruct, reorganize, rewrite, tell, identify | ادمج، تدخّل، صمم نموذجاً، فاض، خطّط، تقدّم، أعد ترتيب، قم بتشكيل، قم ببناء، عزز، نفّح/أعد النظر في، قم بهيكلة، استبدل، تأكد من صحة، قم بتجميع، طور، اكتب مسودة، اخترع، انتج، اقترح، انشر، أعد صياغة الغرض، حمّل/قم بتحميل، دوّن، قم بتركيب (الأفكار، النظريات)، افرز بطريقة تقييمية، اجمع بأسلوب تقييمي، قم بتجميع تراكمي، ألف، اكتب بأسلوب إبداعي، ابتكر، صنّم، ولّد (أفكاراً)، نظّم، أعد تنظيم، قم بإعادة الكتابة، أخبر/قم بموافاة، عين بأسلوب مبتكر |

Arabic action verbs at the appropriate levels and matched the target list. To test the reliability of the provided Arabic Bloom's action verbs list the results of the teacher responses were compared to one another and matched with 100% reliability.

In part 2 of the survey, the faculty were asked to critique the provided Arabic Bloom's taxonomy list. The survey was followed by an interview to discuss with the faculty their responses. Table 2 summarizes the interview results of the three-expert faculty. The responses of the faculty to part 2 of the survey can be categorized into three categories:

1. Critique of the correct placement of the Arabic action verbs into the appropriate cognitive level
2. Critique of the translated equivalent Arabic action verbs
3. Refining of the English and Arabic list of action verbs (removing repeated action verbs and removing action verbs that are difficult to measure).

In response to the comments of the experts we refined and English and Arabic list of Bloom's action verbs. With regards to the critique of the correct placement of the English and Arabic action verbs we kept what we had as it was produced from comparing the Harvard and Stanford lists and cross-checked with the Zhou and Brown (2015) reference. With regards to the critique of the translated Arabic action verbs we deferred to the expert translator and changed the

Table 2. Interview results of the educational experts

| Faculty | Interview suggestions |
|----------|---|
| Expert 1 | The Arabic equivalent action verbs are difficult to understand and use. Some may have different meanings to the intended meanings, and some may be used in different ways. Reverting to the English action verb will help the teacher understand the meaning better. |
| Expert 2 | The action verbs used come from translating the English action verbs. But instead, we can use Arabic terms from our heritage for example in labeling the categories. Some of the action verbs in Arabic may need examples to guide the teachers on how to appropriately use them. |
| Expert 3 | Avoid using verbs that are not measurable. The produced list of English action verbs can be used by English speaking faculty as well. |

translated action verb when the expert translator agreed with the educational expert suggestion.

Next, action verbs that were identified as repeated from one level to another in the English list were cross-checked with a reference list provided by another expert reviewer and were placed in the correct cognitive Bloom's level. Those where there was no consensus on where to place them were removed

from the list. Next, the Arabic equivalents action verbs were adjusted in accordance. Last of all, action verbs that were identified as difficult to measure by the educational experts (such as the action verb *know*) were removed from the list.

Next, we interviewed the educational experts to discuss their suggestions. A summary of the interview results is provided in Table 2.

From the interview results we can see that two of our experts anticipated difficulty in using the Arabic action verbs by teachers. One solution around this as proposed by expert 1 may be to revert to the English equivalents for further clarification.

Translation Issues

Functional translation—theoretical background

It is clear from the Arabic equivalents shown in Table 1 that it is not enough to produce a lexical equivalent if we do not mention such equivalent within a certain context. Also, the Arabic equivalent can be a one-to-many correspondence, and does not have to be a one-to-one equivalent, possibly to convey the same function. Koller (1989, p.100) writes,

There exists equivalence between a given source text and a given target text if the target text fulfils certain requirements with respect to these frame conditions. The relevant conditions are those having to do with such aspects as content, style and function. The requirement of equivalence thus has the following form: quality (or qualities) X in the SL text must be preserved. This means that the source-language content, form, style, function, etc. must be preserved, or at least that the translation must seek to preserve them as far as possible.

Nord (2018, p.11) states,

Translation cannot be considered a one-to-one transfer between languages. Within the framework of such a comprehensive theory of human communication, a translation theory cannot draw on a linguistic theory alone, however complex it may be. What is needed is a theory of culture to explain the specificity of communicative situations and the relationship between verbalized and non-verbalized situational elements.

Also, Nord (2018, p. 62) points out that:

Translation problems can also arise from structural differences in the vocabulary, syntax, and suprasegmental features of the two languages. Some of these linguistic translation problems are restricted to language pairs, as might be the case of cognates or false friends (e.g., English vs German *aktuell*), one-to-many or one-to-zero equivalences (e.g., English river vs French *fleuve/rivière* and German *Berufsverbot* vs English \emptyset). Many of these problems are nevertheless common to several or even all language pairs that include the one particular language.

Newmark (1990, p.106) states that “the translator is often compelled to switch somewhere between strict correspondence and compensation” (Nord, 2018, p. 102) as a translator and translation critic explains that such a procedure between ‘strict correspondence and compensation’ is not randomly selected but carefully used and this is “a consistent global

strategy, which, in turn, is guided by the overall purpose the translation is intended to fulfil”. As the purpose of translating these action verbs in the context of situation, is to show teachers how they can benefit from Bloom’s taxonomy in the teaching and learning process: i.e., to mention these verbs to elicit information from their students in the context of an exam/test or an assignment.

Palumbo (2009) emphasizes the concept that translation is considered “as an act of communication and a form of action involving not only linguistic but also social and cultural factors” Vandal-Sirois and Bastin (2012, p. 26). Obviously, the social/cultural factors contribute to translation in order to make that translation communicative. After all, if it is non-communicative it is non-text; that is, if teachers do not know how to use all these action verbs in Arabic effectively then, Bloom’s taxonomy will possibly be considered by them as useless.

This is the functional approach to translation, in which the function and purpose/skopos of the text with their extratextual factors (e.g., audience, the situation, the sender, time, place, medium), as Nord (2006) proposes, and intratextual factors (subject matter, context, presuppositions, composition, non-verbal elements, style (lexis, sentence structures, suprasegmental features)). In the current study we are considering in the translation only the following intratextual factors (lexis, subject matter context, and composition) which are mainly linguistic and in regard to the extratextual factors the most relevant ones in the translation of these action verbs are (medium [i.e. written to be written, audience [educators, or facilitators], time and place [test/assignment in classroom], and the situation [asking questions in an exam or an assignment]).

Issues specifically related to Arabic equivalents

Given the complexity of the English action verbs used in Bloom’s Taxonomy, these verbs might appear to overlap only if they are considered out of context that is taken from a non-specialised lexicon. Indeed, they do not overlap, once they are put in context and seen under their particular category in the table which shows these verbs and their equivalence in the target language (TL), i.e., Arabic. Therefore, their equivalents should not overlap either, simply because these equivalents are also selected in context in order to show the difference embedded in the same verb when it is used under two different categories. Equivalence is chosen based on its situational context and the level/category it resides in. Sometimes certain action verbs in English have two equivalents in Arabic, e.g. ‘teach’ can be rendered in Arabic *دَرَسَ darras* and *عَلَّمَ ‘allim*, the root of the former is used to produce the noun ‘school’ in Arabic *مدرسة madrasah* and ‘teacher’ *مُدَرِّس mudarris* whereas from the root of the latter the word ‘teacher’ *مُعَلِّم mu‘allim* is derived but this noun is used in Arabic in different contexts to mean a foreman, a boss, a work supervisor and a master (*Lisān al-‘Arab* by Ibn Manzūr). It is interesting to point out that both equivalents are using the second form of the verb *fa‘ala* *فَعَلَ* which implicates the intensity of the action. The former is used in the table in order to eliminate that confusion between the two Arabic equivalents.

The action verb 'test' in the Taxonomy can have two equivalents in Arabic امتحن *imtahin* and اختبر *ikhtabir*. The former is linked to 'examination' and the latter to 'testing in the lab', and the former is chosen because the latter is limited in its scope to a certain environment: i.e., the lab. Even though there is a one-to-one correspondence is applicable in translation but in this case because of having two synonyms, the closest in context is the former.

One-to-one/one-to-many correspondence

That is one feature of Arabic equivalents (having one-to-one correspondence) in Bloom's Taxonomy. The second feature is to find two types of correspondents in Arabic: one-to-one correspondence and one to many correspondences, e.g., غيّر *ghayyir* 'change' or قم بتغيير *qum bi taghayyir* 'make the change', respectively. Moreover, the second option can apply to the Arabic equivalents for a number of English action verbs in the taxonomy, but often the first type of correspondence (one-to-one) is selected if and when it is clear in its context, otherwise the second type is adopted. A similar scenario is seen in the Arabic Equivalent for the English action verb 'solve' which can be rendered either حلّ *hill* for 'solve' (one-to-one correspondence) or قدم حلاً *qaddim hallan* 'provide a solution' (one-to-many correspondence). As for correspondence it can be a one-to-many (that is more than two), e.g., prioritize حسب الأولوية *rattib hasb al-'awlawiyyah* 'arrange according to priority'.

Arabic homographs

It is recommended to avoid homographs in translation, as they can be misleading. Homonym is defined as "a word that is spelled the same as another word but has a different meaning" (Cambridge Dictionary). There are few Arabic homographs that are equivalents for the English action verbs, e.g., *measure* whose Arabic equivalent is either قس *qis* or قىس *qiyas*. The latter is better to use, simply because the former can be misread to mean 'a religious cleric' or 'priest'; that is why the latter is used in the Taxonomy.

Issues in English action words

There are two action verbs which are synonyms: *classify* under Apply and *categorize* under Analyze. They both carry the same meaning. Further, *categorize* is also mentioned under Create, and to solve this issue the translator suggests using one-to-many correspondence, i.e., افرز بطريقة تقييمية *ifriz bi tarīqah taqyīmīyyah* 'to separate in an evaluative manner'.

In order to make Arabic-speaking teachers know how to use the Arabic equivalents in Bloom's Taxonomy accurately, equivalents are provided in context by adding few examples in between brackets, especially in the case that has the same action verb in English which is used in two different levels, e.g. under Understand there is the verb 'defend' دافع *dāfi* which is repeated under Evaluate, and in the latter category the translator needs to provide the context of situation which is to say, (استناداً إلى التقييم دافع) *dāfi* ('*iṣṭinādān 'ilā al-taḥqīm*) 'defend on the basis of evaluation'. Another example is the

two action verbs 'synthesize' and 'assemble'; although they are near-synonyms in English their Arabic equivalents need to be close, but no synonymous, otherwise Arabic-speaking teachers might confuse them. Both equivalents are one-to-many correspondence with additional information put in between brackets to help audience understand how to use them, and this is functional translation – that is providing the Arabic equivalent in context for the English action verb *synthesize* (النظريات، الأفكار، التركيب) *qum bi tarkīb (al-'afkār, al-naẓariyyāt)* 'construct (concepts, or theories)', as for 'assemble' its Arabic equivalent is قم بتجميع *qum bi tajmīi* 'make a collection of'.

In the case of repetition, the translator suggests eliminating the repeated action verb used under the same category, e.g., 'revise' is repeated under in the same category, create; therefore, one of them is removed. This repetition has occurred in the first place due to relying on two different academic and well-established sources.

DISCUSSION AND CONCLUSION

Table 1 can be used by faculty of Arabic and English teacher preparation programs with in-service and pre-service teachers to assign action verbs to the appropriate Bloom's taxonomy levels. The list has criterion-related validity having to do with the references we used which were benchmarked against two reputable top-ranked educational institutions (Harvard and Stanford) and cross-checked with a referenced textbook on Bloom's taxonomy action verbs. The translation also has construct validity as the produced Arabic action verbs were translated by an expert translator who used contextualized translation, meaning that the Arabic equivalents have specific meaning embedded in them which gives the teachers using them clarity in the precise scientific meaning of each action verb. It provides teachers clarity on what level of Bloom to place the Arabic action verb and what precise action it is depicting. Moreover, the list has content validity and reliability as three expert faculty were able to apply it correctly to match the target response. It also was reliable in its use from one faculty to another.

Next, because of the review by the three-expert faculty from teacher preparation programs, the Arabic translated action verbs had no repeat of action verbs from one Bloom's level to another making them specific for each cognitive level. Moreover, the list was further refined with action verbs that were difficult to measure removed from the list. Last of all, to overcome possible ambiguity in the translated Arabic action verbs a solution may be to provide the English equivalent action verbs alongside the translated Arabic action verbs. This way if the prospective Arabic speaking teacher has any ambiguity they may consult with the English equivalents. Hence, the suggestion would be to provide a *bilingual* English-Arabic Bloom's list of action verbs to prospective users.

It is noteworthy to point out that one of the challenges in translating the action verbs from English to Arabic is that in Arabic more than one equivalent meaning is possible depending on the context the action verb is to be used in. For example, our produced unified English list had 172 action verbs in English while the Arabic equivalent list had

293. This was necessary as the translated action verbs were contextualized by the translator to give further meaning, sometimes using parentheses to give further meaning to the translated terms and sometimes by providing more than one Arabic equivalent. This offers lucidity to the translated words and places them more specifically to the educational context they are to be used in making them easier to use for prospective users.

In conclusion, we believe that the contextualized translation provided by the translator gives specific meaning to the action verbs and places them within the appropriate educational context making them easier to use by Arabic-speaking teachers. This should eliminate much of the ambiguity faced by these teachers regarding where and how to use them, and when needed; and the translator provided in parentheses further explanation and meaning to the translated action verbs. The list can also be provided in a bilingual form, providing both English and Arabic equivalents. Next, the provided list has both validity and reliability to be used as a unified list by faculty of teacher preparation programs to assess the correct use of Bloom's action verbs by both pre-service and in-service teachers and can be used by in-service teachers in their schools such as may be the case in preparing their lesson plans.

Hence, the implications of this study were in producing a valid and reliable Arabic translated list of Bloom's taxonomy action verbs that can potentially be used by faculty and student-teachers in Arab teacher preparation programs. As well as ensure teacher literacy in the use of Bloom's action verbs in Arabic.

It may be argued that limitations of this study with regards to the issue of action verbs being inherently reflective of more than one meaning (even within the English language); and that they should not alone be used to indicate the level of thinking of each student learning objective but rather to examine the overall activity, skill, or behavior described in the lesson plan. Also, Stanny (2016) and Newton et al. (2020) have pointed to the presence of action verbs in more than one category in a sample size that is much larger than ours. We acknowledge these limitations and would point to the fact that we endeavored to produce not a definitive list of action verbs but rather a convenient Master list like what Newton et al. (2020) has done, and that can be used practically by teachers in Arabic speaking universities. Moreover, such a list has been checked for sound Arabic contextualized translation as well as having been checked for validity and reliability by teacher preparation faculty with experience teaching Bloom's taxonomy. Next, we see that the limitations of the study come from the need to check the validity and reliability of the produced list of Arabic Bloom's taxonomy action verbs by a wider sample of in-service teachers teaching in schools in the Arab Gulf; to assess the correct use of the produced list which will comprise one of our future research efforts.

Lastly, this list may not be the final say and we hope that it will begin a refinement process that produces a more dynamic Arabic list of Bloom's taxonomy action verbs that utilizes the terminology provided by Arabic and Islamic educational heritage. Another interest of ours will be to subject

the translation of the Bloom's action verbs to a panel of translation experts to further check its validity and reliability. We also aim to continue this work incorporating the technology terms and the affective and psychomotor domains of Bloom's taxonomy.

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APPENDIX

Transliteration table

UNGEGN

| | |
|----------------|--------|
| ب = b | ط = t |
| ت = t | ظ = z |
| ث = th | ع = ' |
| ج = j | غ = gh |
| ح = h | ف = f |
| خ = kh | ق = q |
| د = d | ك = k |
| ذ = dh | ل = l |
| ر = r | م = m |
| ز = z | ن = n |
| س = s | ه = h |
| ش = sh | و = w |
| ص = ṣ | ي = y |
| ض = ḍ | ء = ' |
| long vowel a ā | |
| long vowel i ī | |
| long vowel u ū | |