

## **A new bloom – adding ‘collaborate’ to Bloom’s taxonomy**

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### ***Abstract***

There are a number of opportunities for collaboration, within and between universities, locally, internationally, with industry and with other education providers. University graduates are likely to be placed in a work environment where collaboration is required. Collaboration within higher education institutions has been shown to enhance student learning, and collaborative learning to improve student outcomes. A proposal has been made to add ‘collaborate’ to Bloom’s taxonomy of educational objectives, to emphasise the importance of collaboration and to encourage its inclusion in the educational process and assessment. Collaborate is sited between ‘apply’ and ‘analyse’ in the revised Bloom’s taxonomy hierarchy, and the new version named the New Bloom. This opinion piece expands on the concept and adds the specific objective of ‘work or share with others’ with keywords ‘share, cooperate, reciprocate, achieve consensus’. It also offers a non-hierarchical representation of the taxonomy, with collaborate as an important feature of each of the other components. Adding collaborate to Bloom’s Taxonomy is recommended to emphasise the importance of collaboration and its contribution to each of the other components of the taxonomy.

**Keywords:** collaborate; Bloom’s taxonomy; new Bloom; educational outcomes.

### ***Introduction***

This opinion piece expands on a proposal (Heller, 2022) to add ‘collaborate’ to Bloom’s Taxonomy, to emphasise the importance of collaboration and to encourage its inclusion in the processes of higher education and its assessment.

## ***Why collaborate?***

There are a number of opportunities for collaboration, within and between universities, locally, internationally, with industry and with other education providers. University graduates are likely to be placed in a work environment where collaboration is required.

Collaboration within higher education institutions has been shown to enhance student learning (Kezar, 2005), and there is considerable evidence that collaborative learning improves student outcomes (Laal and Ghodsi, 2012; Scager et al., 2016). Networks of universities usually collaborate on research, but there are examples of how educational outcomes can be met by unlocking the power of collaboration (Joo et al., 2019; SUNY COIL Center; European Consortium of Innovative Universities). An OECD report encourages international collaboration to support the future of higher education (OECD, 2019) and the International Commission on the Futures of Education tells us that 'Pedagogy should be organized around the principles of cooperation, collaboration, and solidarity.' (UNESCO, 2021)

The dangers of competition rather than collaboration in education include unnecessary duplication of courses, and failure to embrace best practice as each institution develops its own variant rather than building on success. Most important is the failure to consider the whole ecosystem, as providers compete rather than come together to meet local, national or global educational needs (Mintz, 2019).

The Covid-19 pandemic has highlighted some wonderful examples of scientific collaboration across institutions, starting with the open publication of the genetic sequence of the SARS coronavirus to facilitate the development of tests and vaccines (Foley, 2021).

## ***Digital opportunities for collaboration***

The digital economy has offered many opportunities for collaboration, as is emphasised in the OECD report (OECD, 2019). The creation and sharing of Open Educational Resources (UNESCO, 2017) is an example of the way in which information can be shared online to allow collaboration rather than competition. As online education becomes increasingly

utilised in the educational process, either in full or in hybrid models, the potential for collaboration increases. A proposed new model for the higher education sector (Heller, 2022) is enabled by a pivot to online education, as is the field of Networked Learning (Networked Learning Editorial Collective, 2021) – both of these approaches include collaboration as a key feature.

### ***Teaching collaboration***

If we accept that there are benefits from collaboration within and between universities, as well as with other players, it would make sense to both teach collaboration to university students and provide opportunities that would facilitate collaboration. There are a number of structural and organisational ways in which collaboration can be facilitated. However, unless collaboration is taught and assessed, it is unlikely to assume importance in the university setting. In order to emphasise the importance of including collaboration in our teaching, the suggestion was made (Heller, 2022a) to add collaboration to Bloom's taxonomy, and this commentary expands on that idea. Laurillard (Laurillard's Conversational Framework) includes collaboration as one of her learning types, and she has also indicated how online technology can support collaboration (Laurillard et al., 2018).

### ***Bloom's taxonomy***

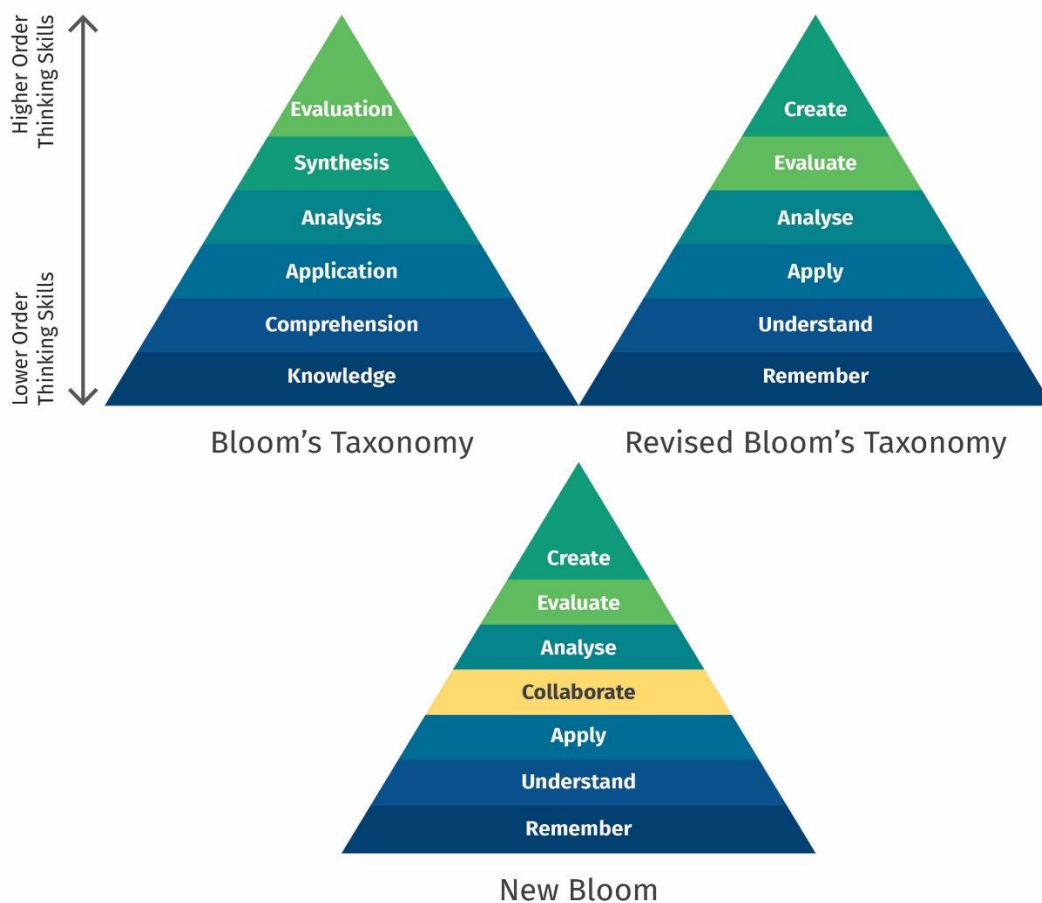
Bloom's taxonomy has been in use for many years to help us define the outcomes we might expect at various levels of learning. Bloom devised his taxonomy of learning in 1956 (Bloom et al., 1956) and it was revised in 2001 (Anderson et al., 2001; Krathwohl, 2002). Among the modifications in the revision was a change in the terms from nouns to verbs, to indicate that the taxonomy reflects actions. In the pyramidal hierarchy, the 2001 version starts with 'remember' and rises to 'create' as the highest order skill. This classification has been very important in defining expected educational outcomes. For example, master's degrees might extend to the 'analyse' and 'evaluate' levels, and PhDs to 'create' - the highest level.

Collaboration does not appear in either version, although a further revision to a digital taxonomy did add collaboration as a separate element, and gave an example of collaboration in the use of digital tools for sharing within the 'applying' rubric (Churches, 2008). Since that paper was written, there have been major advances in the availability of digital software to facilitate collaboration.

***Adding 'collaborate' to Bloom's taxonomy***

The suggestion to add collaboration as a key component in a further revision to Bloom's taxonomy has been made and this new version termed the New Bloom (Heller, 2022a). The New Bloom adds the term 'collaborate' and places it between 'apply' and 'analyse' (Figure1).

**Figure 1. Bloom's taxonomy, the revised Bloom's taxonomy and the New Bloom.**

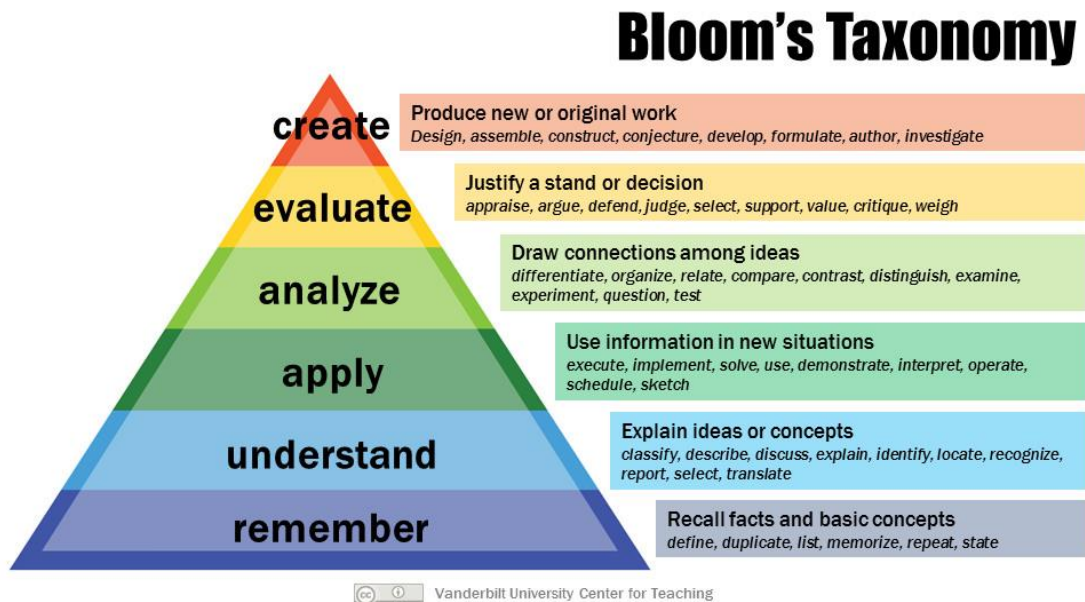


Heller, 2022a, Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>)

**Further detail on the taxonomy**

The Vanderbilt University Center for Teaching is among others who have expanded the Revised Bloom’s Taxonomy to include more detail in order to help the educational process by defining specific objectives and keywords (Armstrong, 2010). It might be worth a short digression on terminology. Bloom titled his taxonomy as relating to educational objectives, although they are not formulated in the way we usually term educational objectives today. They can be thought of as cognitive levels of complexity, or levels of thinking (as in Figure 1). Figure 2 shows the additions of specific objectives with keywords to help with the design and assessment of educational activities.

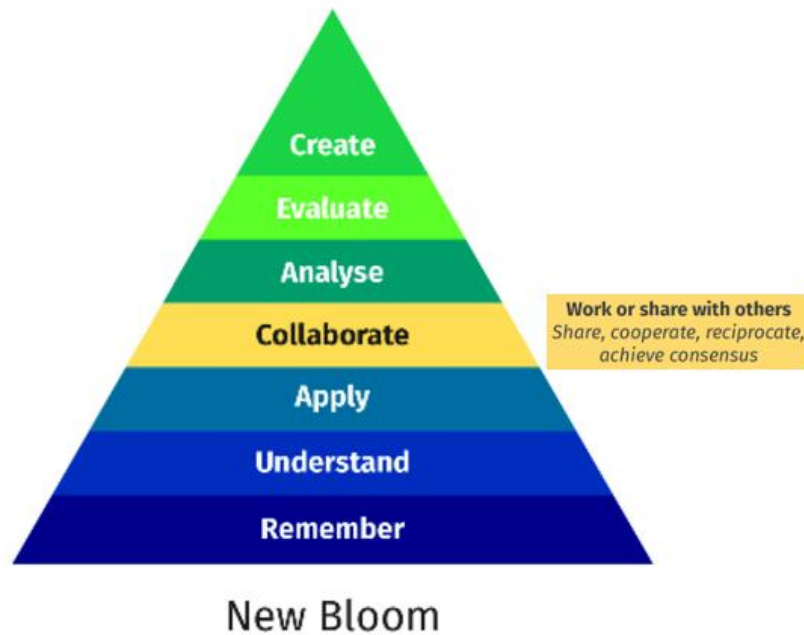
**Figure 2. Bloom’s revised taxonomy with specific objectives and keywords – from Vanderbilt University Center for Teaching.**



Vanderbilt University Center for Teaching (Armstrong, 2010) Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>)

A similar approach for the New Bloom, is to suggest that a specific educational objective for ‘collaborate’ would be ‘work or share with others’ with keywords ‘share, cooperate, reciprocate, achieve consensus’ as shown in Figure 3.

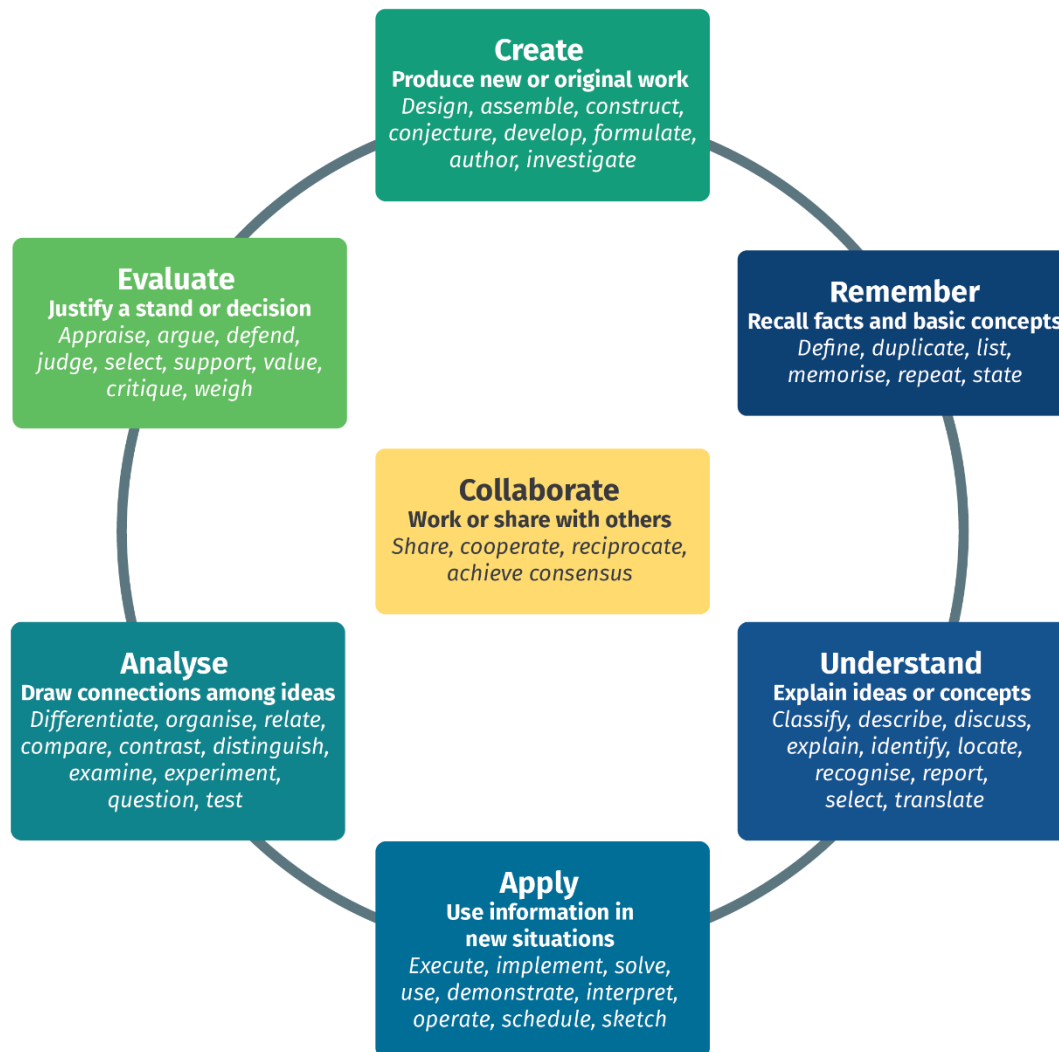
**Figure 3. The new Bloom with specific objectives and keywords for collaborate.**



### ***The hierarchy***

Bloom's concept was for a hierarchy of categories from lower to higher. To show that it is a high-level skill, 'collaborate' is placed above 'apply' and before 'analyse'. Each part of the pyramid should inform the next part, so you have to remember to be able to understand, understand to be able to apply, and so on. Placing 'collaborate' before 'analyse', 'evaluate' and 'create' indicates the importance of collaboration in achieving each of these outcomes. However, it is open to debate as to whether a distinct hierarchical approach is appropriate, and certainly collaboration might also benefit each of the other stages. Even remembering, placed at the lowest end of the hierarchy, might benefit from collaborative learning, which is a recognised educational strategy (Baloch and Brody, 2017). For this reason, Figure 4 represents the taxonomy in a non-hierarchical structure, and places 'collaborate' in the centre to show that it is an important feature in each of the other components of the revised Bloom's taxonomy. Figure 4 also includes the specific objectives and keywords, expanded from those suggested by Vanderbilt to include those for 'collaborate'.

**Figure 4. Non-hierarchical depiction of the New Bloom including specific objectives and keywords.**



Non-Hierarchical New Bloom Taxonomy

Adapted from Heller, 2022a and Vanderbilt University Center for Teaching (Armstrong, 2010). Creative Commons Attribution 4.0 International Licenses (<http://creativecommons.org/licenses/by/4.0/>)

### ***New Bloom in practice***

There are a number of factors which have been shown to relate to the effectiveness of collaboration in the educational setting, such as group size and composition, as well as how students might work together to tackle the types of tasks given to them (Scager et al., 2016). Group-based problem-based learning and peer-to-peer learning are good examples. Concern has been expressed (Eizadirad, 2019) that traditional assessment methods

emphasise competition at the expense of collaboration, so formative and summative assessment should include grading for collaboration through pair or group projects, while respecting and rewarding individual contributions, and/or the demonstration of the use of collaborative tools. The terms used – share, cooperate, reciprocate, achieve consensus – might help inform such activities. Individual educators will want to add to or subtract from these terms. An editorial introduced a special journal issue to showcase many examples of collaboration in higher education (Abegglen et al., 2021).

Online learning provides many opportunities for collaboration (Hammond, 2017; Koris et al., 2021). The term Online Collaborative Learning Theory and the Community of Inquiry models have each been coined to provide both theoretical underpinnings and practical methods for student and student/teacher collaboration (Bates, 2019). In the online setting, discussion groups provide a basis and can be structured to maximise learning outcomes. Peer-to-peer reflection and commentary might also be assessed and graded.

## ***Conclusion***

Adding 'collaborate' to Bloom's Taxonomy is recommended to emphasise its importance and its contribution to each of the other components of the taxonomy. The New Bloom is designed to stimulate opportunities for learning how to collaborate in the higher education setting and beyond.

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