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ShareStats: An open statistics item bank developed by a community of instructors in higher education

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Abstract

Gaining knowledge of statistics is important in most (under)graduate programs within the social and behavioral sciences and requires repeated study by students, highlighting the need for good practice materials. We describe the development of an open item bank of statistics exercises by a community of instructors from Dutch universities: the *ShareStats* project. We describe how we developed the item bank by reusing existing statistics exercises from various institutions. The 5000+ exercises are in Dutch or English and are all quality-checked, categorized, and shared under a Creative Commons License in a single format, which allows for easy export to online learning and testing systems. We describe how we built a professional community of statistics instructors in the Netherlands, which was actively involved in developing the item bank. By continuing to invest in the online item bank and the professional community, we aim to inspire other educators to contribute to open educational resources.

KEYWORDS

formative testing, higher education, item repository, open educational resources, professional community, R/exams, summative testing, teaching statistics

1 | INTRODUCTION

Knowledge and understanding of research methods and statistics are important elements of both graduate and undergraduate programs within the social and

behavioral sciences. This knowledge helps graduates to understand and evaluate empirical research as researchers or professionals. Acquiring this knowledge of statistics requires in-depth and repeated study by students.² Making comprehensive loops of study, exercise,

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and feedback available to students plays an important role in encouraging this type of learning. The availability of practice material with interim feedback allows students to self-monitor and redirect their own learning, resulting in greater self-confidence and motivation, and ultimately better results.^{20, 25}

Although statistics instructors are aware of the need for good practice material, the development of such material often takes place in inefficient ways.⁷ Indeed, many instructors in higher education create such practice material individually or in cooperation with other instructors within their own departments. Much can be gained in terms of efficiency and quality if educators collaborate to reuse, share, and further develop learning materials. Being able to access a larger, shared set of practice and test items allows instructors to select good-quality material.

Developing high-quality items is a skill that necessitates specialized training.⁶ Access to a repository of well-crafted items enables educators, particularly those honing this skill, to utilize suitable questions in their teaching practices.

Furthermore, the desirability of sharing educational materials is emphasized by international educational policies and initiatives,^{8, 9, 15, 18, 22, 28} which advocate for open educational resources.²¹ These initiatives aim to facilitate student learning through the free availability of high-quality educational materials, not only enhancing resource availability but also fostering professional communities where educators share and collaboratively improve materials.³

Professional communities can play two important roles: First, they ensure the high quality of educational resources by leveraging collective expertise. Second, they facilitate the organization and categorization of these materials, substantially enhancing their accessibility and the ease with which they can be shared among educators.

In this article, we describe the development of *ShareStats*, an openly available item bank of statistics practice and test items created by a community of instructors in higher education in the Netherlands. The aim of the ShareStats project, which was financed through a grant by the Dutch Ministry of Science, Education, and Culture, was twofold: First, we aimed to provide a freely accessible comprehensive collection of statistics exercises. These statistics exercises are offered in plain text (Markdown) format along with an open and free software tool (the exams package of the statistical software environment R, called 'R/exams'²⁹), to be compatible with commonly used learning management systems (LMSs) and testing systems, such as Canvas, Blackboard, TestVision, and Grasple. Second, we aimed to build a professional community of statistics instructors

from higher education institutions in the Netherlands. Through collaboration and exchange within this community throughout the project, we achieved a higher quality of the learning materials and improved the user-friendliness of the item bank.

Briefly, the project consisted of re-using a selection of existing statistics exercises from various universities and sharing them openly. The collection of statistics exercises consists of exercises in both Dutch and English at the undergraduate level. The exercises are freely available to instructors as well as students without restrictions or costs. This enables higher education institutions to use these exercises for various forms of both formative and summative assessment. Moreover, it is in line with the previously described goal of international policies and the policy of various student organizations to publish educational materials freely with open licenses.

Further, with the development of a quality model for statistics exercises as well as a taxonomy of statistical topics to categorize the exercises, we aimed to guide the reuse of existing learning materials in such a way that this would ensure a selection of high-quality items. The broader professional community was actively involved by investing in personal contact with methods and statistics departments at other universities and by organizing meetings to work together on the quality model, the taxonomy, and the setup of the item bank.

2 | PROJECT DESCRIPTION

2.1 | Development of the item bank

The development of the item bank was a collaborative effort, involving subteams from the project team from various Dutch universities and the engagement of a professional community.

This process included defining a taxonomy to classify undergraduate statistics topics and developing and implementing a quality model, which guided the selection and potential improvement of items based on a checklist. Items were then edited and reformatted in a new file in plain text (Markdown) format that was designed to be converted to other formats using an open software tool (R/exams). The project resulted in an item repository for storing items in a standardized format and R/exams conversion functions to facilitate importing items into LMSs, enhancing accessibility and usability.

A website was developed (www.sharestats.nl) on which the item bank of statistics exercises can be accessed and searched. This website contains the item repository, item development instructions including the quality checklist, the taxonomy, a search engine to select

items by topic, and some scripts to automate the process of item conversion in two instances. The item repository and the products we developed to create the item bank are also published in the public domain, at <https://github.com/ShareStats>.²⁶ The project is also listed on the Dutch website <https://edusources.nl>, which promotes open educational resources.

Below, we describe the taxonomy, the quality model, the item repository, and the R/exams conversion functions in more detail, along with some examples to illustrate the process of the development of the item bank.

2.1.1 | Taxonomy

As a first step to build a comprehensive item bank, a taxonomy was developed. First, this taxonomy contains a hierarchical classification by topic (see Figure 1 for an example of branches in the taxonomy). We started with a list of topics commonly found in introductory statistics books, such as Moore, McCabe, and Craig,¹⁹ Gravetter and Wallnau,¹¹ and Agresti.¹ To that list, we added topics and subtopics covered in the undergraduate statistics courses the authors taught in the past and are currently teaching. During the first community meeting, we asked for input from instructors at various universities and were able to edit the list and add some (sub)topics. We aimed to create a dynamic list that includes all statistical topics commonly covered in undergraduate statistics courses for the social and behavioral sciences. The

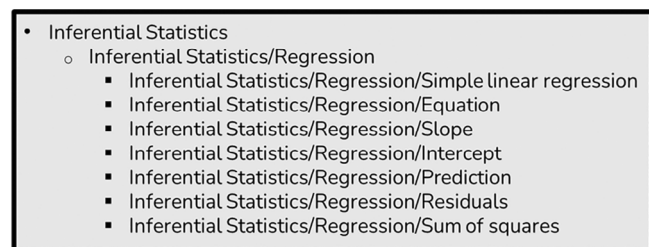


FIGURE 1 Categorization of statistics exercises by topic: example of a branch in the taxonomy.

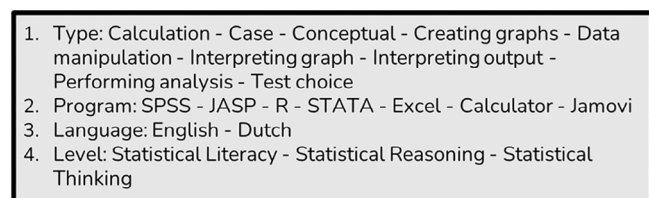


FIGURE 2 The categorization of statistics exercises other than by topic used as meta-information in the items.

hierarchical structure was chosen for searchability purposes. When searching for a term, all topics lower in the tree are automatically also selected.

Besides the topics, the taxonomy also contains classifications by type of exercise, type of software linked to the exercise, language, and level of learning (see Figure 2). The levels of learning used in the taxonomy are statistical literacy, statistical reasoning, and statistical thinking, which we derived from Garfield and Ben-Zvi,¹⁰ who adapted the levels of Bloom's taxonomy⁴ to fit statistics education. The levels of learning build on each other: statistical literacy provides the foundational knowledge, statistical reasoning develops the ability to make sense of and interpret statistical information, and statistical thinking enables the application of this knowledge to complex (real-world) problems. Each level requires progressively deeper understanding and more complex cognitive skills. An example of a question assessing statistical literacy would be "Calculate the residual term for this person," whereas an example of a question assessing statistical reasoning would be "Explain how the predicted value is greater than the observed value for this person."

2.1.2 | Quality model

As a second step, the ShareStats project developed a quality procedure in order to check the quality of the items and decide whether an item could be added to the item bank or not, or whether it should be revised before addition to the item bank. The quality procedure and an accompanying checklist are available at <https://www.sharestats.nl/development/qualityProcedure.html>. The flowchart displaying the main steps is shown in Figure 3.

The conversion process started with a workshop for all project members and their teams to make sure that everybody knew how to work with the taxonomy. This included the naming of the items, which ensures the correct placement in the taxonomy tree.

In the quality procedure, two project members, referred to as Person A and Person B in the checklist, reviewed items in a two-step approach. Initially, Person A selected a question (Step 1 of the flowchart) and, in the case that it contained multiple questions to the same introduction, Person A separated these questions into multiple files to create several stand-alone questions that were not dependent on one another (Step 2). Next, Person A was responsible for editing and reformatting the item in a new file in Markdown format (Step 3), with separate files and a folder structure for English and Dutch language (Step 4). Subsequently, Person A added labels derived from the taxonomy that described the branch by

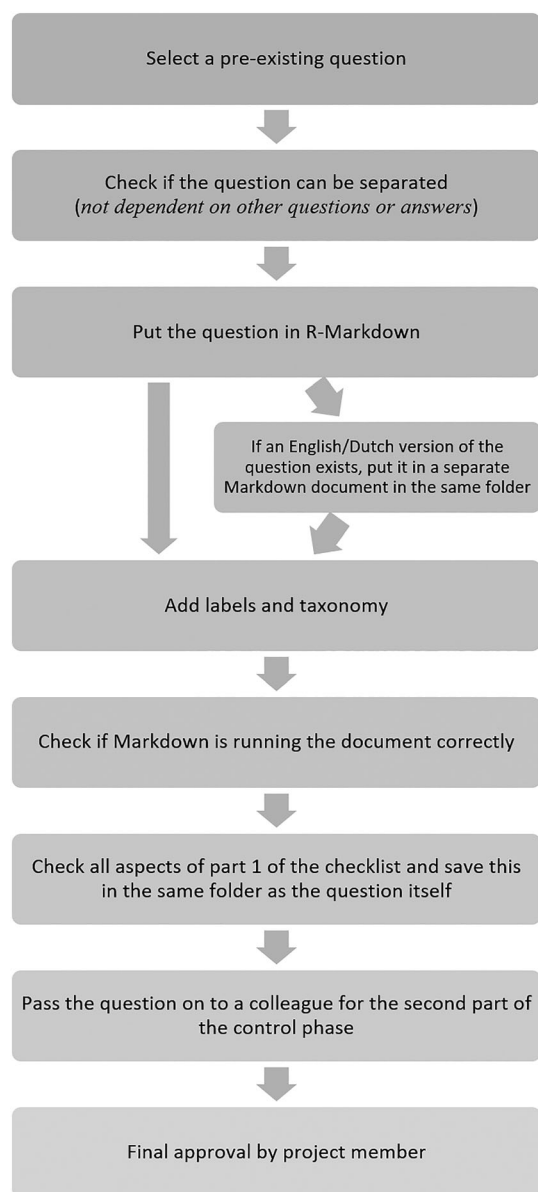


FIGURE 3 Flow chart of the quality model.

topic and typological information, such as learning level and type of exercise (Step 5). Next, Person A verified its compilation (Step 6) and used a separate checklist for evaluating the clarity, accuracy, adherence to testing principles, proper statistical terminology, and avoidance of copyright infringement (Step 7). Subsequently, Person B re-examined the question against the same checklist (Step 8), focusing on completeness and correctness, before a final review by a project member (Step 9).

As part of the quality control, the project manager of each participating university worked closely with their project members who were working on converting the items to ensure consensus on the classification and naming of the items.

In this way, the ShareStats team applied a thoughtful and structured process to maintain the quality of the item bank. This approach helps us ensure the quality of current content and future additions and contributes to shared standards within our professional community.

2.1.3 | Item repository

Employing a quality model and taxonomy for selection, updating, and classification transformed nearly 5000 statistics exercises into an accessible item bank. Of these exercises, nearly 2000 were adapted from “Statistiekfabriek” (English: “Statistics Factory”), a former project providing an adaptive testing and practice platform for statistics exercises.^{12, 16}

The original exercises available at the participating institutions came in different formats (e.g., Canvas or Blackboard quizzes, Word documents, PDFs of exams, etc.). Following the procedure described above, each exercise has been quality checked, and where necessary, the item content was improved; subsequently, the item was converted to a single Markdown file, including the addition of Latex code for equations where necessary. The file suffix used for saving each item was “.Rmd” indicating that its format is a combination of R and Markdown. This procedure was undertaken locally at each contributing institution.

To create a new Markdown file for each item, the original item content was edited in the right format, and meta-information was added using the taxonomy. To ensure that the Markdown file could be compiled properly, each item was then validated by compiling it with R/exams into at least HTML and PDF formats. Items were named and categorized in subfolders based on the taxonomy. After conversion, the project team collected all items, uploaded them to a GitHub repository, and published them under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

Most exercises in the item bank are multiple-choice items with four alternatives. Part of the statistics exercises in the item bank has been enriched with feedback. Some exercises include formulas, figures, tables, or datasets. An example of such a quality-checked statistics exercise converted to Markdown format is presented in Figure 4. The Markdown file consists of three parts: the Question, the Solution, and the Meta-information. The first part contains the question, including reference to a figure (a “.png file” with a scatterplot) and an answer list with the four answer options for the question. The second part consists of the solution with a second

FIGURE 4 Example of a statistics exercise in Markdown format. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1111/test.12990)]

```

```{r, echo = FALSE, results = "hide"}
include_supplement("uu-example-scatterplot-001-en-graph.png")
```

Question
=====

A researcher has collected data from a sample of 31 cities across the nation on the need for victim support. She wants to use a regression model to predict the number of people in need of victim support based on the crime index. A scatter plot of the data and the regression line is shown below:



One of the observations is circled in the graph. What do we know about this city?

Answerlist
-----
* The predicted number of people in need of help is larger than the actual number of people.
* The actual number of people who need help in this city exceeds the predicted number of people.
* The residual for this city is equal to $e \approx 1.7$.
* The residual for this city is equal to $e \approx 3.8$.

Solution
=====

Answerlist
-----
* Because the regression line falls above the observation, the predicted number of people in need of help in this city (the point on the line) is larger than the actual number of people (the circled data point).
* Because the regression line falls above the observation, the actual number of people in need of help in this city (the circled data point) is actually *smaller than* the predicted number of people (the point on the line).
* Because the observation lies below the regression line, the residual is actually negative for this observation.
* Because the observation lies below the regression line, the residual is actually *negative* for this observation.

Meta-information
=====
exname: uu-example-scatterplot-001-en
extype: schoice
exsolution: 1000
exsection: Inferential Statistics/Regression/Residuals
exextra[Type]: Conceptual
exextra[Language]: English
exextra[Level]: Statistical Literacy

```

answer list containing the feedback given to the students depending on the answer they provided. The third part contains the meta-information, including information about which of the four answer options is correct (the first answer option, indicated by “exsolution: 1000”), and the tags from the taxonomy: it is a conceptual question in the English language at the level of Statistical Literacy about the topic Inferential statistics/Regression/Residuals.

2.1.4 | R/exams conversion functions

Before the start of the ShareStats project, the R package “exams” (R/exams) already contained a collection of conversion functions, like those for exporting exercises in Markdown format to document formats like Microsoft Word, PDF, and HTML.

R/exams also contained two conversion functions, each conforming to a version of the international

Question and Test Interoperability (QTI) standard, version 1.2 and version 2.1, both maintained by the IMS Global Learning Consortium, Inc.^{13, 14} Additional functions exist, which are adaptations of these functions, tailored to exporting items to LMSs such as Canvas, Blackboard, and Moodle.

To meet the goals of the ShareStats project, additional conversion functions were created to export items to a Dutch online testing environment, TestVision (“exams2testvision”), and a Dutch online interactive practice platform for learning math and statistics, GraspLe (“exams2graspLe”). Also, to allow for the re-use of existing collections of questions in TestVision, a conversion function was created for exporting items from TestVision to a Markdown format (“testvision2exams,” its result is ready for exporting to any of the other formats in the package).

These new functions were added to R/exams and are readily available in its most recent version.²⁷ Figure 5 illustrates the conversion of an item from Markdown to Canvas format using the “exams2canvas” function to convert the Markdown file, as presented in Figure 4.

2.1.5 | How to use the item bank

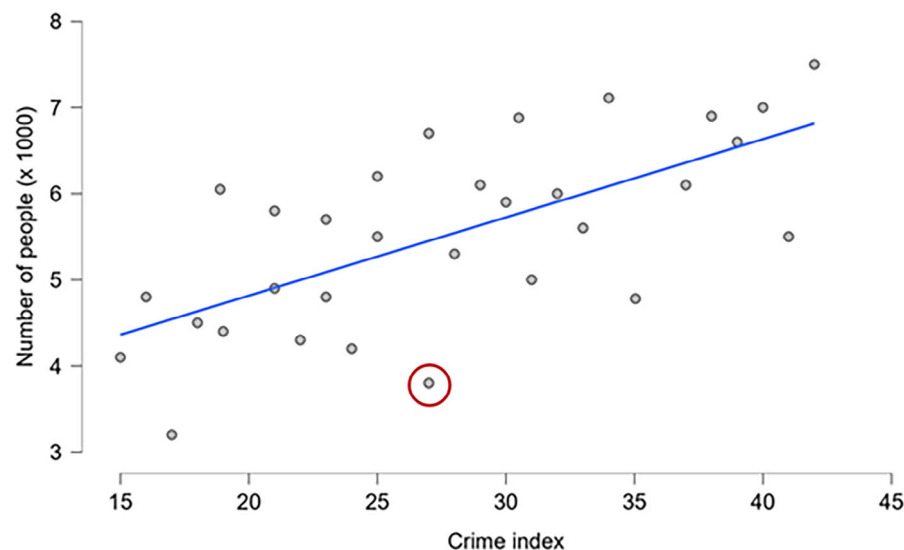
Next, we present how the item bank can be used by instructors.

Extraction

On the website (www.sharestats.nl), exercises can be accessed and searched according to various keywords linked to the taxonomy, such as topic, question type, level, and language. Selected items can be downloaded (i.e., the markdown file and, if applicable, its data files and figures) and can subsequently be compiled using R/exams for export to the preferred LMS or testing system for use in teaching or testing. As an alternative, the complete set of statistics items can be downloaded as one batch from the Sharestats GitHub repository (<https://github.com/ShareStats/itembank>).

Materials created in the ShareStats project can be customized to the liking of the user by downloading and editing the Markdown files. This requires installing two pieces of software: R²⁴ and R/exams.²⁹ Although it is not

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One of the observations is circled in the graph. What do we know about this city?

- ☐ The residual for this city is equal to $e \approx 3.8$.
- ☐ The residual for this city is equal to $e \approx 1.7$.
- ☐ The predicted number of people in need of help is larger than the actual number of people.
- ☐ The actual number of people who need help in this city exceeds the predicted number of people.

FIGURE 5 Example of a statistics exercise exported from Markdown to Canvas. [Colour figure can be viewed at wileyonlinelibrary.com]

essential, it is advised to also install Rstudio,²³ a user-friendly environment for R. More information can be found on the ShareStats website: <https://www.sharestats.nl/development/ItemDevelopment.html>, and a “How to” video is available on our YouTube channel and on the website: <https://www.sharestats.nl/instructions/>.

To make things even more user-friendly, collections of items—rubricated in main topics—will be bundled to the industry standard QTI format and some common proprietary formats for widely used assessment applications like TestVision. This way, sets of items can be downloaded and subsequently directly imported into popular systems all at once.

Application

After downloading items from the ShareStats website, instructors can utilize the item bank to create a variety of assessment and practice materials for students. For example, based on the experiences of the authors, instructors can create traditional homework assignments, adaptive online assignments, formative tests, example exam questions, and so forth. Additionally, the item bank's compatibility with many LMS platforms streamlines the process of creating quizzes and exams, considerably reducing the time required for assessment preparation. This can be especially beneficial during busy semesters, freeing up instructors to focus on other teaching tasks.

Using the items from the ShareStats website benefits instructors and students alike. Using items created by other instructors from other universities does not only simplify the creation of assignments and tests but may also serve as an inspiration for different types of questions. As instructors may have the tendency to ask the same type of question that they are used to, using the ShareStats items will broaden their horizon, which will, in turn, improve statistics education at large. Having access to a wide variety of questions will also benefit students in their everlasting quest for more study materials. Being able to practice more and in a wide variety of formats will increase the knowledge and understanding of the students.

2.2 | Professional community

We have established an active professional community of methods and statistics instructors in higher education, and we managed to tie many of them to the ShareStats project. We accomplished this using the following steps.

First, we set up a LinkedIn page through which we kept the professional community informed of our activities. This page has over 50 members. In addition, educators were able to subscribe to our mailing list to receive

our newsletters. The mailing list consists of about 90 members, and statistics instructors from all Dutch universities are represented. In addition, lecturers from universities of applied sciences, university colleges, and university medical centers are also affiliated.

Furthermore, we organized three community meetings during the course of the project. A concluding meeting was held on October 14, 2022, in collaboration with the Dutch Association for Statistics and Operation Research (Dutch abbreviation: VVSOR). The meetings were well attended, with an average of 20 people representing almost all Dutch universities. During these meetings, we presented and discussed the taxonomy, the quality model, and a first set of items from the item bank and asked the participants for feedback on these products.

Based on the community's feedback, we were able to further develop the item bank and underlying materials. We added topics to the taxonomy, steps to the quality model, and new tags to the exercise files. This process has led to an open attitude of sharing and exchange. For instance, it has led to a better alignment of education practices across the participating institutions.

3 | PROJECT EVALUATION

The ShareStats project members produced an open and free online item bank of almost 5000 statistics exercises. In addition, an active professional community of statistics instructors was created. In what follows, we discuss some key insights and an evaluation of our experiences with both aspects of the project.

3.1 | Evaluation of the (development of the) item repository

One of the goals of the grant that financed this project was “to stimulate the use of open educational resources, where educators share, re-use, and continue to develop materials in communities, to offer students a wide range of good quality study materials.” In this project, we focused on recycling existing test items in a sustainable way and not on creating new items, but rather revising existing items based on our quality procedure. This resulted in a rich offering of different types of test items covering a wide variety of topics, which is openly available to instructors world-wide.

Even though many questions date back to before the digital testing era and are therefore multiple-choice questions, we have also included questions with other formats in the repository. This includes numerical questions,

analysis questions that require the use of a dataset and software, and longer case scenarios with various questions about the same case. Although R/exams allows for creating the latter type of question, many LMSs and Testing systems do not allow for the import of such questions and therefore they were often split up to form several separate items.

A challenge in this project was to fully cover all sub-topics in our taxonomy. Especially because we are all teaching statistics in the social and behavioral sciences, there are various (sub)topics in the taxonomy that are not commonly covered in our curriculum, such as Venn diagrams or the z -test for two proportions. We understand that there may be instructors who do teach these topics or topics not currently in the taxonomy. On the other hand, some topics that were initially not included in the taxonomy, because we may have labeled them as master level instead of bachelor level, were added to the taxonomy during the span of the project. If questions existed from one of our bachelor courses about these topics, we decided to include the questions and added the topic to the taxonomy. This way of working illustrates the dynamic aspect of the taxonomy.

Part of our quality procedure was to classify items by one of three levels of learning statistics. We understand that universities and instructors worldwide may evaluate the level of certain topics differently. We decided on a dual solution. First, before the creation of the item bank, we decided to use several example items as part of a working exercise during one of the workshops we organized for the professional community. It turned out that we reached consensus rather quickly. Second, now that the item bank is completed, users of the item bank are encouraged to share their feedback on the GitHub platform. By creating the possibility to share feedback, ideas, and concerns, we have created a dynamic item bank that can be changed, updated, and improved in the years to come.

The choice to create the items in R/exams was twofold: first, it satisfies the universal conditions for open educational resources. Second, it is independent from commercial parties in test applications and learning systems. This way, we could ensure its longevity. An added bonus was that conversion functions to other platforms were partially already available, and if not already existing, they were programmable. Programming, however, did take away a lot of time from other tasks. We somewhat underestimated the effort needed by our programmers for the development of import and export functions: import functions to take existing questions out of online learning environments and add them to the ShareStats item bank, and export functions to bring the openly available items in an accessible way to LMSs and testing systems.

Even though we followed all open educational resources guidelines, commercial parties may still pose obstacles to the practical use of open education products. Programming conversion functions that satisfy the needs for a specific system allows the users easy access. However, despite all the programming efforts described above, uploading questions from the item bank to a specific system may still be infeasible due to the absence of an upload functionality. In some cases, even when an upload feature existed, it was not accessible to individual users. In the end, we were successful in creating exchange options for many of the most commonly used systems.

3.2 | Evaluation of the (development of the) professional community

The second goal of the ShareStats project was to create an active professional community of statistics instructors. After the initial meetings with the project team, we deliberately chose to involve this professional community from the very start of the project. We solicited input and feedback at several stages of the process because we deemed maximum involvement of community members—and most likely the future users of our products—important. In online meetings, we presented both interim and final products and discussed the development of these products with the wants and needs of the community. This also resulted in the generation of engagement and bonding with other educators.

The collaboration with the community not only worked well; it was also well received by the educators in the community, and the experience turned out to be a positive addition to the project for the project team members. Through this cooperation, for instance, we were able to add topics and tags to the taxonomy. Via (online) workshops and meetings, we were able to generate interest and enthusiasm among community members, some of whom were even interested in adding to the project. Meetings were recorded for later use and were often viewed by more community members at a later time.

As sustainability was one of the main goals of this project, we looked for a sustainable platform for connecting with the community members from other institutions. The solution was the establishment of a Statistics Education section within the Dutch Statistical Association (VVSOR), which is well known within the professional community in the Netherlands. The project team members are actively involved, and many members of the community as well. The last (closing) meeting of the ShareStats project coincided with the first meeting launching the Statistics Education section with a theme

of digital testing, at which we presented the possibilities of the ShareStats item bank. This was received with enthusiasm, and we were able to make some connections for possible future collaborations.

One of the main benefits of the collaboration with instructors from other institutions was the personal development we all went through. Because each university has its own courses, its own methods, and its own habits, we were all able to learn from each other and improve our own ways: both in teaching and in our professional lives. For this reason, the cooperation and collaboration between team members continue even today.

4 | CONCLUSION

During the 2 years of our project, we edited, compiled, and classified thousands of exercises in such a way that they are now searchable and available for use in various formats and online assessment systems. Through the increased use of statistics practice materials from the ShareStats item bank, there is now more material to offer in courses, both at the participating universities and at other universities worldwide.

While open educational resources for statistics education like MOOCs,¹⁷ textbooks,⁵ and practice assignments are becoming more available, ShareStats stands out in several aspects. First, this item bank is one of the few extensive open-access item banks focused on statistics for higher education in the social and behavioral sciences. It offers unrestricted access to both faculty and students, unlike (semi-) commercial platforms. Moreover, ShareStats offers format-independent items that can be adapted to any LMS or teaching approach. Additionally, its community-driven quality assurance process ensures high-quality items, and university collaboration results in diverse item content reflecting a wide variety of teaching methods.

The ShareStats item bank is currently already being used at all participating Dutch universities for bachelor-level methods and statistics courses. Not only the authors are using the item bank, but also other instructors of their departments. Because there are questions and exercises from a wide range of sources in the item bank, this will allow instructors to develop new and more extensive assessment materials.

The ShareStats item bank is also beneficial for the students, as it has led to more comprehensive collections of practice materials for them: with more practice comes more study success. By openly sharing the item bank and embedding it in a professional community, we have achieved both of our primary objectives.

Through LinkedIn and the Dutch Statistical Association VVSOR, we continue to actively stay in touch with the community. The meetings that the newly minted Statistics Education section of the VVSOR has organized and will organize in the future enable us to think about follow-up projects and collaborations together as a community. This may involve further expansion and development of the ShareStats item bank, but it may also involve new initiatives in the area of sharing materials in statistics education openly, such as the development and sharing of knowledge clips or publicly available books.

The project team has committed to keeping the ShareStats item bank alive for the next 4 years. Biannual meetings will take place to evaluate the quality and deployment of the item bank and make arrangements for its continued use within the professional community. As we remain actively involved in the professional community, we encourage others to collaborate with us by either adding items to the bank or topics to the taxonomy using the GitHub platform. By joining forces, we can work on sharing and reusing materials to cover all topics.

Noteworthy is the fact that the project team has recently received additional funding from Npuls for translating all items to both Dutch and English, for programming more conversion functions to additional LMS's, and for creating instruction videos for all LMS's (<https://npuls.nl/regeling-boost-je-collectie/>). The project team is also investigating whether follow-up funding can be obtained to expand the item bank to more methodological topics. Items have already been set aside in Markdown format that are more generally methodological in nature, which could easily be added as part of a follow-up project and would greatly enhance the scope of the item bank.

As we continue to cooperate and work together on this and future projects, it has become clear that it is very well possible to have instructors from different universities work together. By sharing Open Educational Resources and building a professional community, we have not only let other instructors and students benefit, but we have also inspired others to start sharing educational resources openly.

In conclusion, the ShareStats item bank is a useful resource for instructors in designing statistical learning activities. With a wide selection of pre-screened questions and the possible integration into LMS's, the item bank facilitates educators to enhance their students' learning experiences.

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