

Increasing Multilingualism in ATLAS' Science Communication

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Despite modern particle physics being an international endeavour, the vast majority of its educational material is only published in English. By making material available in other languages, physicists can make inroads with new audiences – especially those very young or very old – in their home countries. The ATLAS Collaboration has published colouring books, a teaching guide, activity sheets, fact sheets and cheat sheets aimed at communicating science to a non-expert audience. An effort is underway to translate this content into as many languages as possible, taking advantage of the countless multilingual members of the collaboration. Currently, all of this content is available in at least two languages other than English, with the ATLAS Colouring Book being the one available in the most languages (21 so far). The reach of this multilingual content is presented.

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1. Introduction

Modern particle physics has been an international endeavor, with people across the world contributing to its research and understanding. This global participation is very well reflected in experiments at the Large Hadron Collider at CERN laboratory. In a world with more than 7000 spoken languages, to make science accessible to everyone science communication in different languages is a necessity. As the vast majority of educational material is only published in English, the availability of materials in other languages may help science find many new audiences. The ATLAS experimental collaboration [1], with its 5900 members of 103 nationalities, native speakers of many different languages has been pursuing a series of efforts to translate educational material into as many languages as possible.

2. Multilingual efforts for education and outreach in ATLAS

2.1 Translations activities of educational materials

The educational materials in different languages are created and translated by the multilingual members of the ATLAS collaboration. For the translation efforts, at first original texts are created by the ATLAS outreach team in English language, then they are translated into many other languages by ATLAS members and associated volunteers. After the translations are reviewed by ATLAS members, fluent in those languages, ATLAS outreach team members work on reformatting texts, layouts for new languages before they are published in ATLAS webpage [2, 3, 4, 5] and distributed to the public.

Table 1 provides a consolidated summary of recent translation efforts by ATLAS. 'The ATLAS Colouring book', being the first educational content that was translated into multiple languages, is currently available in a maximum number of 21 different languages. Similarly, other educational materials are being translated into different languages in ongoing efforts.

2.2 Data on translated ATLAS materials

To analyze the global reach of translation efforts in ATLAS, monthly download data on translated ATLAS materials are collected. The amount of data for any such material depends on the time the materials have been available on the ATLAS webpage. Spikes in the downloads are often linked to public events and knowledge of the existence of these materials by physicists telling people in their home countries.

Fig. 1 shows the download data of the 4 ATLAS materials in different languages as a function of time. For the ATLAS colouring book, which has been available since 2016, with more and more translations over the years, the share of downloads in the English language has decreased gradually. This reflects the fact that translations are reaching audiences of different languages. For other educational materials such as ATLAS Activity Sheets, ATLAS Fact Sheets, ATLAS Cheat Sheets, etc., the newly translated documents continue to be downloaded from the ATLAS website and reach new audiences.

To evaluate the reach of the translated educational materials in different countries, based on the data of geographic locations of downloads, maps are created for each printable document. Figure 2 shows 4 pairs of world maps for downloads in the English language and downloads in languages

other than English. The maps indicate that the ATLAS educational materials are downloaded in all the continents and with an increasing number of translations into multiple languages, the number of downloads increase significantly.

Name of educational material	Number of documents	Publication time	Number of languages	Available languages
ATLAS Colouring book [6]	1	November, 2016	21	English, French, German, Spanish, Italian, Portuguese, Welsh, Romanian, Slovak, Ukrainian, Greek, Bulgarian, Russian, Hebrew, Polish, Swedish, Turkish, Urdu, Arabic, Bengali, Chinese
ATLAS Particles of the Universe [7]	1	January, 2020	11	English, French, German, Spanish, Italian, Greek, Chinese, Polish, Portuguese, Finnish, Urdu
ATLAS Activity Sheets [8]	6	April, 2021	7	English, Spanish, French, Italian, German, Portuguese, Chinese
ATLAS Fact Sheets [9]	10	March, 2021	4	English, Spanish, French, Italian
ATLAS Cheat Sheets [10]	3	March, 2021	3	English, Spanish, French
Guide for Parents and Teachers [11]	1	February, 2022	2	English, Portuguese

Table 1: Available translated educational materials by ATLAS collaboration

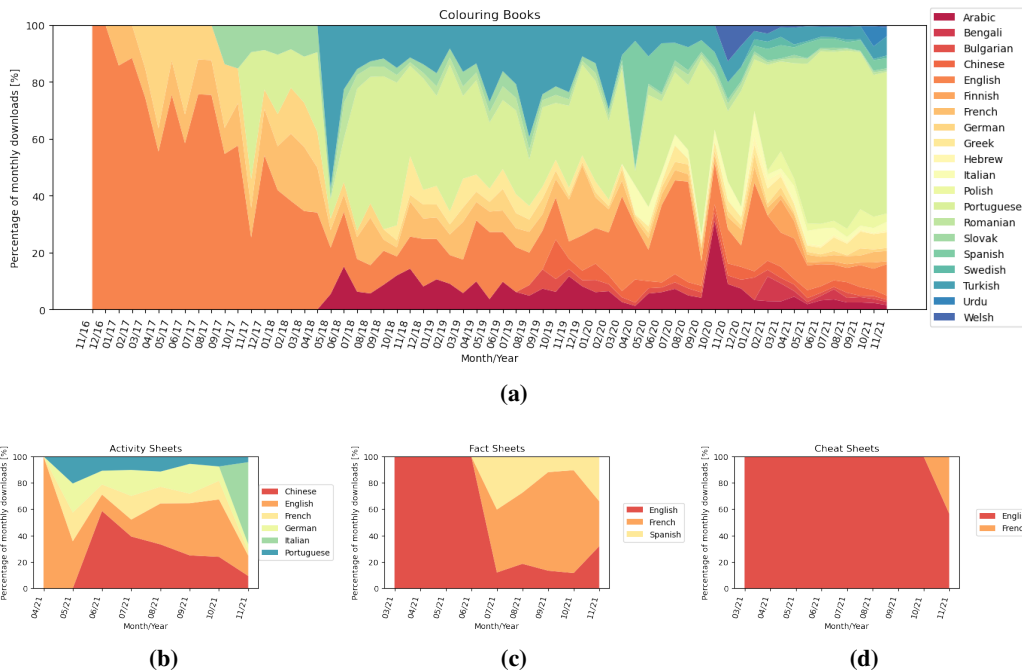


Figure 1: Monthly download data for the following educational documents: (a) ATLAS Colouring book, (b) ATLAS Activity Sheets, (c) ATLAS Fact Sheets, (d) ATLAS Cheat Sheets.

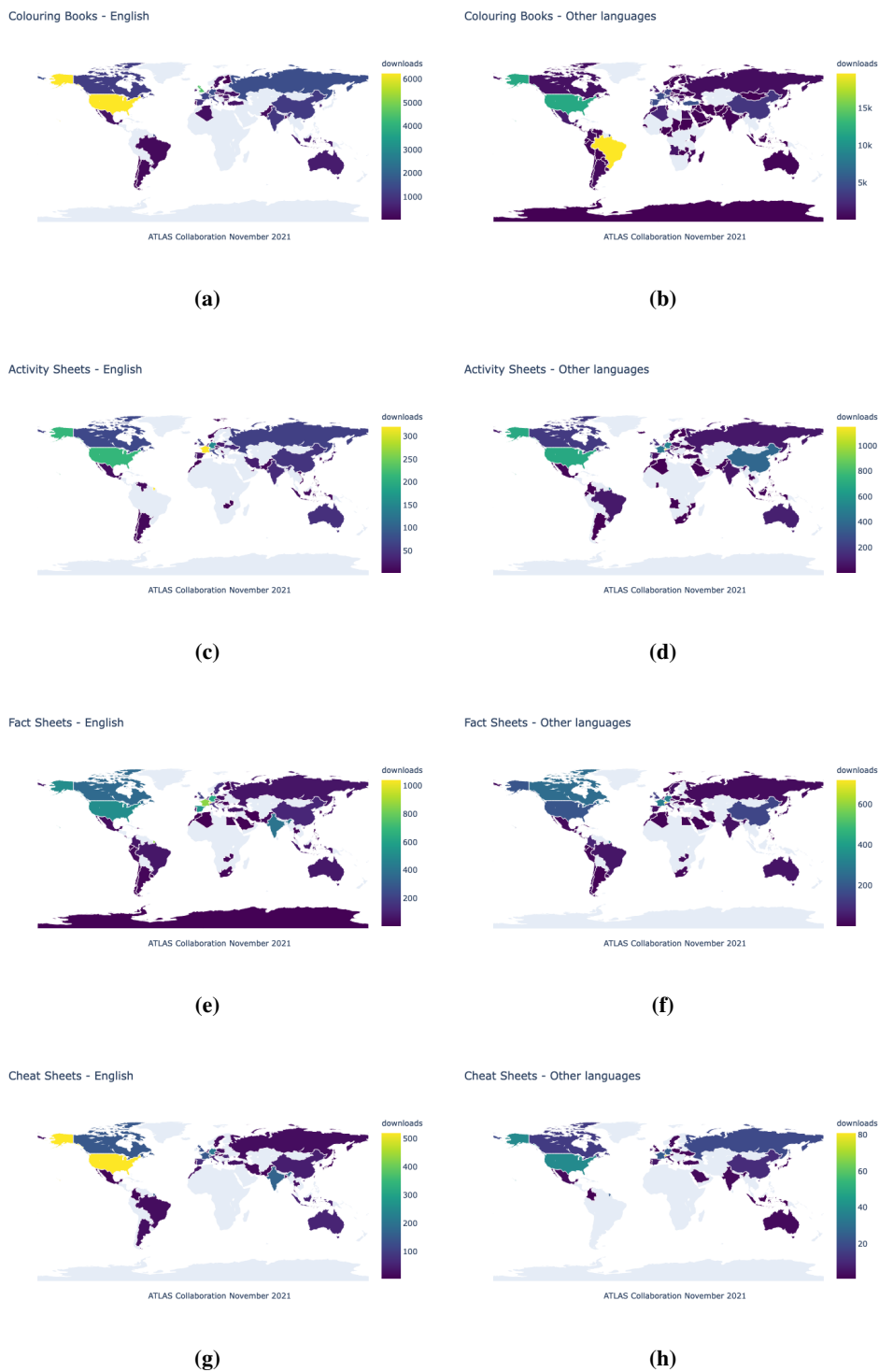


Figure 2: Comparison of world maps based on download data of the educational materials. The left figure shows the data for the English language and the right figure shows the download data for other languages for the following documents : (a)-(b) ATLAS Colouring book, (c)-(d) ATLAS Activity Sheets, (e)-(f) ATLAS Fact Sheets, (g)-(h) ATLAS Cheat Sheets.

2.3 Other Multilingual efforts for education & outreach

In the ATLAS collaboration, apart from translation activities, there have been other multilingual efforts and services available. The guided tours at the CERN laboratory for the ATLAS experiment are offered in at least 27 different languages. Particle Physics Masterclasses of ATLAS are offered in 13 different languages such as Czech, Danish, English, French, German, Greek, Italian, Norwegian, Polish, Portuguese, Slovak, Spanish and Turkish. Regular outreach events are organized in different languages by regional research groups individual ATLAS members in different countries.

3. Conclusion

Various multilingual resources are provided by the ATLAS collaboration. Translations of educational materials and multilingual efforts depend on its volunteer base and it is open to public contributions. Download data of ATLAS printables show that multilingualism efforts in ATLAS' Science communication have been successful in reaching out to many more audiences around the world. ATLAS Colouring Books and Activity Sheets, which are available in a greater number of languages have been downloaded many times. Drawing on the collective experience of the ATLAS experiment an even greater increase in multilingual science communications can be achieved.

References

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