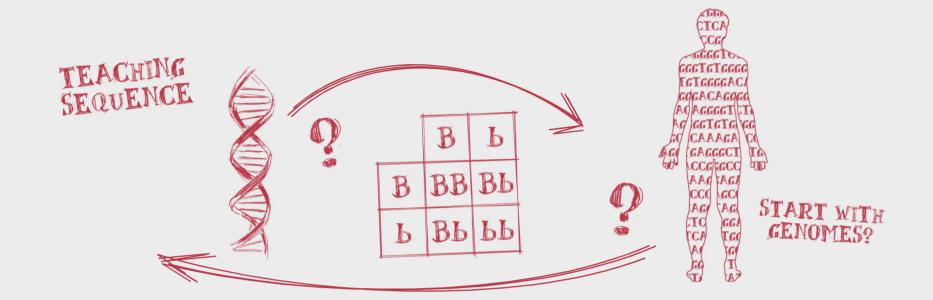
PROMOTING SCHOOL LEARNERS' UNDERSTANDING OF GENOMICS

Determining the basis for further research and curriculum development

HOW CAN SCHOOL SCIENCE MOVE FROM GENETICS TO GENOMICS?

The traditional focus of school genetics has been on the functions and inheritance of single genes.

- More than a decade after the Human Genome Project, what should children learn about genes and genomes in school?
- What is known about pedagogical approaches to helping children understand ideas about genomes, inheritance and DNA?
- What teaching and learning resources are available?



IDENTIFYING KEY ISSUES IN GENOMICS EDUCATION

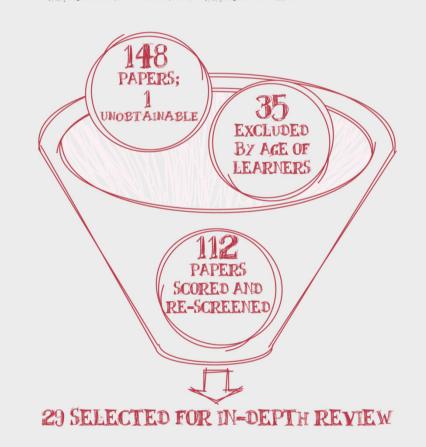


As a preliminary exercise, members of the UK's Biology Education Research Group (a special interest group of the Royal Society of Biology) were invited to contribute to a discussion, using methodology derived from the Delphi Technique. Four major issues emerged from the discussion: practice in schools, curriculum development, professional development for teachers and the place of Mendelian genetics. This study aimed to synthesise a landscape review of research related to practice in schools and of curriculum and resource development for genomics education.

LANDSCAPE REVIEW OF RESEARCH

Method

- The landscape review employed simplified systematic review methods.
- Searches of bibliographic databases yielded 148 papers related to the teaching and learning of genomics.
- These were screened by applying exclusion criteria (including age of learners), then scored based on relevance, quality and risk of bias.



Results

Types of study, as a percentage of the 112 papers on the 'long list':



Non-

empirical

Intervention

design &

Production &

evaluation of

Other

empirical

Longitudinal

case

study

Experimental

(at least one

control group)

study evaluation (e.g. survey) resources

Detailed analysis of the 29 papers selected for in-depth review is ongoing.

SURVEY OF TEACHING RESOURCES

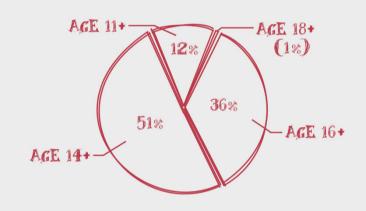
Method

- A catalogue was compiled of free, online resources that could be useful in genetics and genomics teaching.
- The search strategy deliberately emulated that which a teacher in England might use.
- Attributes of each resource were recorded, including target age range, purpose and whether the science ideas go beyond traditional genetics.

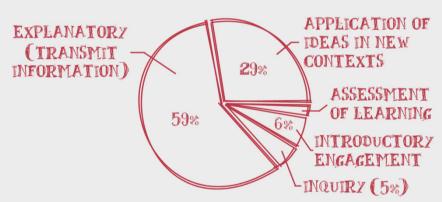


Results

• The 200+ catalogued resources are suitable for a range of ages.



 Most are explanatory (transmit information); very few facilitate inquiry or assessment of learning.



 Around one third of the resources go beyond traditional genetics to introduce ideas about genomics.

CONCLUSIONS

There is considerable variation in what is considered 'genomics' by different authors.

There is a case for a 'rebalancing' of non-empirical and empirical research.

Further research must collect robust evidence to answer questions raised by academic discussion.

Research into the effects of different teaching sequences of genetics and genomics ideas should inform future curriculum development.

There is presently a lack of resources that facilitate inquiry and formative assessment of genomics learning.

Some existing, high-quality genomics resources are archetypes for future resource development.

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