Curriculum Vitae

Helena Johansson, Associate professor in mathematics education
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Education

Degrees

2015-06-04:	Doctor of Philosophy (Ph.D.) in Mathematics, specialising in Educational Sciences, University of Gothenburg.
2013-11-20:	Licentiate of Philosophy (Ph.L.) in Mathematics, specialising in Educational Sciences, University of Gothenburg.
2007-12-18:	Master in Education, Växjö University (now Linnaeus University).
2004-09-17:	Master of Science in Mathematics with Orientation towards Industrial Mathematics, University of Gothenburg.

Other

2025, spring:	Research Leader Initiative, Advanced (course for established research leaders), Linnaeus University, Mälardalen University, Karlstad University and Mid Sweden University.
2020-2021:	Research Leader Initiative (course for research leaders), Mid Sweden University.
2020, spring:	Pedagogical portfolio (course on how to document pedagogical qualifications), Mid Sweden University.
2020, spring:	"The Writing boost" [Skrivlyftet] (course to develop students' academic and professional writing), Mid Sweden University.
2019-2020:	Higher education and flexible learning (15 credits), Mid Sweden University.
2016, autumn:	Course for postgraduate supervision, Mid Sweden University.
2005-2006:	Various physics courses (90 credits), University of Gothenburg.

Positions

2023-12-14	Appointed as Associate professor (Docent) in Mathematics Education at Mid Sweden University
2018-08 – present	Senior lecturer, Department of Mathematics and Science Education, Mid Sweden University.
2016-08 – 2018-07	Postdoc, Department of Mathematics and Science Education, Mid Sweden University.
2016-01 – 2018-07	Senior lecturer, Department of Teacher Education, University of Borås.
2015-08 – 2016-02	Guest lecturer, Department of Mathematical Sciences, Chalmers University of Technology and University of Gothenburg.
2013-01 – 2013-05	Visiting student researcher, Graduate School of Education, University of California Berkeley.
2009-09 – 2015-04	Doctoral student, Department of Mathematical Sciences, Chalmers University of Technology and University of Gothenburg.
2008-08 – 2012-12	Teacher in mathematics and physics, Kitas upper secondary school, Gothenburg.
2005-01 – 2008-06	Teacher in mathematics and physics, Alströmer upper secondary school, Alingsås.

Teaching experience

2023, November:	Erasmus+ Teacher Mobility at MEF University, Istanbul, Turkey.
2021, April:	Appointed as Accredited teacher, Mid Sweden University

Upper secondary education

Mathematics and physics courses in vocational and university preparatory programmes, mainly in the technology and natural science programme. Additionally, mathematics courses in preparatory programmes at the university.

Higher education

Undergraduate education

Mathematics courses and courses on mathematics teaching and learning in the teacher education programmes. Furthermore, supervision of over a hundred degree-projects in mathematics education for teacher students. In addition, course coordinator for several mathematics courses in the teacher education programmes at Mid Sweden University, and responsibility for the development of these courses. The courses range from A-C level in the first cycle.

Moreover, participation in developing and implementing various commissioned training courses: *Programming for teachers*, *Mathematics education for preschool teachers working in*

preschool classes, *Dynamic mathematics programs*, and a research circle for teachers, with a focus on the use of manipulatives in mathematics teaching.

Postgraduate education

Supervision

Main supervisor for Laura Jean Champagne, start September 2024.

Doctoral courses

Participation in developing and conducting courses in mathematics and science education for graduate students.

Evaluations

2024, November: Member of grading committee for doctoral thesis by Helén Sterner, Linnaeus University/Dalarna University, Sweden.

2024, June: Substitute-member of grading committee for doctoral thesis by Karoline Holmgren, Umeå University, Sweden.

Publications

Journals (peer reviewed)

Jäder, J., & Johansson, H. (2025). Exploring students' conceptual understanding through mathematical problem solving: Students' use and shift between different representations of rational numbers. *Research in Mathematics Education*. https://doi.org/10.1080/14794802.2025.2456840

Johansson, H., Westman, A.-K., Norberg, M., & Eliasson, N. (2024). Teachers' use of digital textbooks in mathematics and science education. *LUMAT: International Journal on Math, Science and Technology Education*, *12*(3), Article 10. https://doi.org/10.31129/LUMAT.12.3.2455

Johansson, H., & Kilhamn, C. (2024). From process to object in teachers' introductory algebra discourse. *International Journal of Mathematical Education in Science and Technology*, *55*(8), 1814-1830. https://doi.org/10.1080/0020739X.2022.2075810

Johansson, H., Österholm, M., Flodén, L., & Heidtmann, P. (2024). Clash of cultures? Exploring students' perceptions of differences between secondary and tertiary mathematics education. *International Journal of Mathematical Education in Science and Technology*, *55*(7), 1567-1596. https://doi.org/10.1080/0020739X.2022.2070558

Johansson, H., & Österholm, M. (2023). Algebra discourses in mathematics and physics textbooks: Comparing the use of algebraic symbols. *International Journal of Mathematical Education in Science and Technology*. https://doi.org/10.1080/0020739X.2023.2226154

Johansson, H. & Österholm, M. (2019). Objectification of upper-secondary teachers' verbal discourse in relation to symbolic expressions. *The Journal of Mathematical Behavior, 56*. https://doi.org/10.1016/j.jmathb.2019.100722

Johansson, H. (2017). Dependence between creative and non-creative mathematical reasoning in national physics tests. *Nordic Studies in Mathematics Education, 22*(2), 93-119.

Johansson, H. (2016). Mathematical Reasoning Requirements in Swedish National Physics Tests. *International Journal of Science and Mathematics Education 14*(6), 1133-1152. https://doi.org/10.1007/s10763-015-9636-3

Conference proceedings (peer reviewed)

Johansson, H., Norberg, M., & Österholm, M. (in press). Cohesion and tension between modes in textbooks. *TSG Proceedings, The 15th International Congress on Mathematical Education*, Sydney, 7-14 July, 2024.

Johansson, H., Oskarsson, M., & Nyström, P. (2019). Fysikbegreppets flyktighet: En konsekvens av kursplaneförändringar? [The physics concept's volatility: A consequence of curriculum changes?]. In K. Stolpe, G. Höst, & A. Larsson (Eds.), *Från forskning till fysikundervisning: Bidrag från konferensen 10-11 april 2018 i Lund arrangerad av Nationellt Resurscentrum för Fysik* [From research to physics education: Contributions from the conference 10-11 of April 2018 in Lund arranged by the National Resource Center for Physics Education], (pp. 33-46). Linköping University Electronic Press.

Johansson, H. (2015). Relation between mathematical reasoning ability and national formal demands in physics courses. In K. Beswick, T. Muir & J. Wells (Eds.), *Proceedings of 39th Psychology of Mathematics Education conference*, (Vol. 3, pp. 121-128). Hobart, Australia: PME.

Books and book chapters

Johansson, H., Andersson, H., Nordlinder, E., & Von Zeipel, H. (2024). Akademiskt skrivande i flerämnesutbildningar [Academic writing in programs including several subjects]. In A.-C. Edlund, A. Engström, I. Lennartson-Hokkanen & M. Westman (Eds.), *Skrivlyftet vid Mittuniversitetet: Akademisk literacitet i praktiken* [The Writing-boost at Mid Sweden University: Academic literacy in practic], (pp. 116-130). Mid Sweden University.

Theses

Johansson, H. (2015). *Mathematical reasoning: In physics and real-life context* [Doctoral dissertation]. University of Gothenburg.

Johansson, H. (2013). *Mathematical reasoning in physics tests: Requirements, relations, dependence* [Licentiate thesis]. University of Gothenburg.

Johansson, H. (2007). *Elevers vardagsföreställningar och fysikundervisningens utformande* [Students' naïve conceptions and the organisation of physics teaching]. [Degree project, Master of Education]. Växjö University (now Linnaeus University).

Johansson, H. & Hromic, M. (2004). *Identifiering av fysiska parametrar för en AGV (autonomous guided vehicle)* [Possibility of estimating the physical parameters in the control system for an AGV]. [Degree project, Master of Science]. University of Gothenburg and Chalmers University of Technology.

Reports

Johansson, H., Oskarsson, M., & Nyström, P. (2018). *Glömska eller ytliga fysikkunskaper: Fördjupad analys av svenska elevers sjunkande fysikresultat i TIMSS Advanced 2015* [Forgotten or superficial physics knowledge: An in-depth analysis of Swedish students' decreasing physics results in TIMSS Advanced 2015]. Swedish National Agency for Education.

Nyström, P., Kjellsson Lind, A., Dahlberg, U., & Johansson, H. (2016). *Hur samstämmiga är svenska styrdokument och nationella prov med ramverk och uppgifter i TIMSS Advanced 2015?* [How aligned are the Swedish policy documents and national tests with the framework and the tasks in TIMSS Advanced 2015?]. Swedish National Agency for Education.

Popular science publication

Johansson, H., & Jäder, J. (2024). Begreppsförståelse genom problemlösning [Conceptual understanding through problem solving]. *Nämnaren, 2024*(2), 39–45. NCM, Nationellt centrum för matematikutbildning

Westman, A-K., & Johansson, H. (2023). *Självständigt arbete i samverkan: En försöksverksamhet på lärarutbildningen* [Degree project in collaboration: A pilot project in teacher education]. Mid Sweden University.

Johansson, H., & Westman, A-K. (2022), *Likvärdig matematikundervisning: En modell för att stötta obehöriga lärare* [Equal mathematics education: A model to support uncertified teachers]. Mid Sweden University.

Conference presentations (peer reviewed abstracts)

Johansson, H., Norberg, M., & Österholm, M. (2024). Supporting mathematics teachers' planning of multimodal teaching. In T. Evans, O. Marmur, J. Hunter, & G. Leach (Eds.). *Proceedings of the 47th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 1, p. 156). Auckland, New Zealand: PME. [Oral Communication].

Johansson, H., Norberg, M., & Österholm, M. (2024). Cohesion and tension in task design: Students working with multimodal tasks. In J. Häggström, C. Kilhamn, L. Mattsson, H. Palmér, M. Perez, K. Pettersson, A.-S. Röj-Lindberg, & A. Teledahl (Eds.), *Mediating mathematics: Proceedings of MADIF 14 The fourhteenth research conference of the*

Swedish Society for Research in Mathematics Education Örebro, March 19–20, 2024 (p.149). SMDF. [Short presentation].

Johansson, H., Norberg, M., & Österholm, M. (2023). Interplay between modes in mathematics textbooks. In M. Ayalon, B. Koichu, R. Leikin, L. Rubel., & M. Tabach (Eds.), *Proceedings of the 46th Conference of the International Group for the Psychology of Mathematics Education*, (Vol. 1, p. 262). Haifa, Israel: PME. [Oral Communication].

Johansson, H., Norberg, M., & Österholm, M. (2022a). A multimodal perspective on number sense in digital learning resources. In C. Fernández, S. Llinares, A. Gutiérrez & N. Planas (Eds.), *Proceedings of the 45th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 4, p. 241). Alicante, Spain: PME. [Oral Communication].

Johansson, H., Norberg, M., & Österholm, M. (2022b). Number sense in the app Vektor: Mathematical progression and use of various modes. In L. Mattsson, J. Häggström, M. Carlsén, C. Kilhamn, H. Palmér, M. Perez & K. Pettersson (Eds.), *The relation between mathematics education research and teachers' professional development: Proceedings of MADIF 13 The thirteenth research conference of the Swedish Society for Research in Mathematics Education Växjö, March 29–30, 2022* (p. 141). SMDF. [Short presentation].

Johansson, H., & Österholm, M. (2021). Algebra discourse in mathematics and physics textbooks for upper secondary school. In M. Inprasitha, N. Changsri & N. Boonsena (Eds), *Proceedings of the 44th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 1, p. 149). Khon Kaen, Thailand: PME. [Oral Communication].

Johansson, H., Oskarsson, M., & von Zeipel, H. (2021). Engineering students' approach to studying mathematics and its influence on their achievement. In J. Wang (Ed.) *Proceedings of the 14th International Congress on Mathematical Education* (Vol. 1, p. 350 & 353). East China Normal University Press & World Scientific. [Paper presentation, Topic study group 2, Shanghai, China, July 11-18, 2021].

Johansson, H. & Kilhamn, C. (2019). Grade 6 teachers' objectification of the algebra discourse. In M. Graven, H. Venkat, A. Essien & P. Vale (Eds), *Proceedings of the 43rd Conference of the International Group for the Psychology of Mathematics Education* (Vol 4, p. 51). Pretoria, South Africa: PME. [Oral Communication].

Johansson, H., Österholm, M., Flodén, L., & Heidtmann, P. (2018). Teachers' and students' perception of the gap between secondary and tertiary mathematics. In E. Bergqvist, M. Österholm, C. Granberg & L. Sumpter (Eds.), *Proceedings of the 42nd Conference of the International Group for the Psychology of Mathematics Education* (Vol. 5, p.77). Umeå, Sweden: PME. [Oral Communication].

Johansson, H. & Österholm, M. (2018). Clash of cultures? Teachers' and students' perceptions of differences between secondary and tertiary mathematics education. Short presentation at *MADIF 11, the eleventh Swedish Mathematics Education Research Seminar,* Karlstad, Sweden, January 23-24, 2018.

Johansson, H. & Österholm, M. (2017). Upper-secondary teachers' objectification of symbols by their use of language. In B. Kaur, W. K. Ho, T. L. Toh & B. H. Choy (Eds.), *Proceedings of the 41st Conference of the International Group for the Psychology of Mathematics Education*, (Vol. 1, p. 215). Singapore: PME. [Oral Communication].

Johansson, H. (2016). Real-life context and mathematical reasoning: Influences on students' success on mathematics tasks. Paper presented in Topic study group 18 at *The 13th International Congress on Mathematical Education* (ICME-13), Hamburg, Germany, July 24-31, 2016.

Johansson, H. (2013). Relation between imitative and creative mathematical reasoning when solving physics tasks. In A. M. Lindmeier & A. Heinze (Eds.), *Proceedings of the 37th Conference of the International Group for the Psychology of Mathematics Education*, (Vol. 5, p. 80). Kiel, Germany: PME. [Oral Communication]

Johansson, H. (2012). Mathematical reasoning requirements in Swedish national physics tests. Poster presented at *The 12th International Congress on Mathematical Education* (ICME-12), Seoul, Korea, July 8-15, 2012.

Johansson, H. (2012). Mathematical reasoning requirements to solve tasks in physics tests. In C. Bergsten, E. Jablonka & M. Raman (Eds.), *Evaluation and Comparison of Mathematical Achievement: Dimensions and Perspectives: Proceedings of MADIF 8, The Eighth Mathematics Education Research Seminar, Umeå, January 24-25, 2012* (pp. 211-212). SMDF. [Short presentation]

Popular science presentations

2024: Mathematics biennial, Örebro, Sweden, March 21 - 22.
#1: *Funktionella läromedel i matematik: Hur samspelet mellan olika uttrycksformer kan stötta elevers lärande av matematiska begrepp* [Functional textbooks in mathematics: How interplay between different modes can support students' learning of mathematical concepts]. Lecture together with Malin Norberg and Magnus Österholm.
#2: *Begreppsförståelse genom problemlösning* [Conceptual understanding through problem solving]. Lecture together with Jonas Jäder.

2022: RUN-riksdag, Sundsvall, Sweden, March 3-4. *Digitala läromedel i praktiken* [Digital textbooks in practice]. Lecture together with Nina Eliasson, Malin Norberg and Anna-Karin Westman.

2022: Mathematics biennial, Växjö, Sweden, March 31 - April 1.
#1: *Likvärdig matematikundervisning* [Equivalent mathematics education]. Lecture together with Anna-Karin Westman and Mats Sjöström.
#2: *Uttrycksformer i digitala läromedel: Samspel mellan bilder, skrift och symboler* [Modes in digital learning resources: Interplay between pictures, writings and symbols]. Lecture together with Malin Norberg and Magnus Österholm.

Grants

2025 – 2028 Project grant (4 500 000 SEK), Swedish institute for Educational Research: Functional teaching materials in mathematics: *Mathematical problems for an enriched and differentiated teaching* (Principal investigator: Helena Johansson).

2024 – 2025 Project grant (784 000 SEK), collaboration agreement Mid Sweden University and Härnösand Municipality: *Mathematics diagnostic tests and mathematical knowledge in upper secondary school* (Principal investigator: Helena Johansson).

2024: Project grant (464 000 SEK), Mid Sweden University: *Quizzes in mathematics courses at university to increase pass rate* (Principal investigator: Helena Johansson).

2022 – 2023 Project grant (600 000 SEK), ULF-research project Mid Sweden University: *The potential of mathematical tasks for visualizing and developing students conceptual understanding* (Principal investigator: Jonas Jäder)

2022: Project grant (261 000 SEK), ULF-research project Mid Sweden University: *Student thesis in collaboration between the school practice and teacher education* (Principal investigator: Anna-Karin Westman).

2021 – 2022: Project grant (654 000 SEK), collaboration agreement Mid Sweden University and Härnösand Municipality: *Mathematical problems for conceptual understanding* (Principal investigator: Helena Johansson).

2021 – 2024: Project grant (2 645 000 SEK), Swedish institute for Educational Research: Functional teaching materials in mathematics: *How the interplay between different semiotic resources can support students' learning of mathematical concepts* (Principal investigator: Magnus Österholm).

2021: Project grant (1 250 000 SEK), ULF-research project Mid Sweden University: *Digital textbooks in practice* (Principal investigator: Anna-Karin Westman).

2020 – 2021: Project grant (615 000 SEK), collaboration agreement Mid Sweden University and Sundsvall Municipality: *Equity in mathematics education: Professional development in mathematics education from an organisational perspective* (Principal investigator: Helena Johansson).

2020 – 2021: Project grant (400 000 SEK), collaboration agreement Mid Sweden University and Örnsköldsvik Municipality: *A mathematics app for students and teachers* (Principal investigator: Magnus Österholm).

2019: Conference grant, Wenner-Gren Foundations (59 000 SEK); Annika & Gabriel Urwitz' Foundation (25 000 SEK): LUMA-NT (Chair: Helena Johansson).

Other merits

2021- present: Member of the PME International Committee/Board of Trustees (International group for the Psychology of Mathematics Education)

2019: Chair for the LUMA-NT conference, an annual national conference for mathematics and science teacher educators.

2019: External expert for Swedish National Agency for Education: reference group during work with changes in the syllabus for upper secondary school mathematics.

2017: External expert for Swedish National Agency for Education: in depth studies of the results on TIMSS Advanced 2015.

2015 – 2024: Invited reviewer for international journals in mathematics education.