

PX-Graph – New graphics package

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Work was carried out as a project

- Project started on October 2017
 - Requirements were defined
 - Different graphics engines were considered
 - ... and SharpPlot was chosen
 - ... because we knew it can deliver what was needed!
 - Coding work was put out to tender
 - ... and we luckily got just the man we wanted!
- Actual coding work started on April 2018
- Project ends this week



Integration into PX-core didn't work out so an external module was made

Otherwise the project proceeded as planned and almost all of the original goals were achieved!

Our main goals were ...

- To create an **intelligent** graph component which recognizes right presentation methods for data in question
 - Based on VARIABLE-TYPE definitions and number of selected variables and their values
- To extend all the relevant interactive functionality (variable selection windows, automatic file type conversions, language versions) into the **saved query** (for both tables and charts) outputs themselves
- To create a **base/tool** for all data service developers ... not just a graphical data output for end users!
- “Millions of statistical graphs with a price of one!”

"Bible of Kim"

Graph type	Variable type						Note!
	Content	Time	Classificatory 1	Classificatory 2	Classificatory x	Sum	
Horizontal bar	1	1	2-30	0-1	0-1		Possible ELIMINATION value
Pie	1	1	2-10	0-1	0-1		ELIMINATION value can't be
Line	1-10	2-x	0-10	0-10	0-10	1-10	Possible content variable v
Pyramid	1	1	2	2-x	0-1		Classificatory 2 variable sh
Scatter	2	1	2-x	0-x	0-x		
Vertical bar (column)	1	1-x	1-x	0-1	0-1		Either time or some other
Stacked horizontal bar	1	1	2-30	2-10	0-1		ELIMINATION value can't be
Stacked vertical bar (column)	1	1-40	2-10	1-40	0-1		Either time or some other
Grouped horizontal bar	1	1-2	2-20	2-4	0-1	4-40	ELIMINATION value can't be
Grouped vertical bar (column)	1	1-20	2-4	0-20	0-1		Either time or some other
Must be included							
Can't be included (with more than one value)							
Can be included							
Where for example "0-x" ... is a range of possible number of values selected from that variable							

All the thresholds are carried out as parameters so they can be quite easily adjusted according to your own beliefs! 😊

Results

- If time and content variables are not defined in px table, they are inquired from user
- Single selected values are omitted from the pivoting (and underlying table structure) and placed to the title instead
- Data is automatically pivoted for a right layout in charts
 - With tables the original layout is preserved
- Only possible chart types are allowed ...
 - ... so in many cases table is an only optional "chart type"
 - "Note" will be used as a tip tool why other chart types are not available
- Dynamic references [FIRST] and [LAST] can be used in title for time variable range in question
- Cycle lengths for labels of continuous variables can be adjusted when needed
- Different templates (fonts, colour palettes) can be defined for different needs

- Any preselected combination of variables with any preselected combination of values ... can be shown as selection pull-downs ... right next to a saved “scrollable” table or chart
- **In line graphs** it is also possible to define some of the dimensions as multiselectable (... user can select multiple values from that dimension)
- Dynamic reference ALL can be used also when defining scrollable variable values
- Pull-down for filetype conversions (copyable chart, html table) for exactly the same data selections (=“snapshot”) as user sees at that moment as a chart/table
- Can be embedded easily in anybody's webpages without restrictions
- Output types and formats ... as well as selected values from pull-downs ... are also configurable as parameters in url
 - ?type= ... screen, embed, filed, scroll
 - ?format= ... png, svg, html
 - ?v1i=6 ... → 6th value from variable 1 (index position)
 - ?v2c=SSS ... → value with code “SSS” from variable 2

Links to some examples:

Try to do your own graph:

http://pxwebapi2.stat.fi/PXWeb-PxGraf/pxweb/en/StatFin/StatFin_kou_akop/statfin_akop_pxt_001.px

2 "fixed" lines and 3 single selection dimensions:

<http://pxwebapi2.stat.fi/PXWeb-PxGraf/sq/8546c54f-995b-4c28-ad5c-82be6ca4513d>

1 multiselection dimension and 2 single selection dimensions:

<http://pxwebapi2.stat.fi/PXWeb-PxGraf/sq/d5e09cf3-bec4-477a-81c4-06f3440e8dcf?v2c=SS>

<http://pxwebapi2.stat.fi/PXWeb-PxGraf/sq/d5e09cf3-bec4-477a-81c4-06f3440e8dcf?v1i=3&v2i=3,4,5&v3i=3>

- Notice that single selected values are shown in subtitle ...
- ... and values from multiselectable variables are shown as labels

With one ... or multiple default values:

<http://pxwebapi2.stat.fi/PXWeb-PxGraf/sq/94788694-cff8-42b5-97be-d0e1296ed55f?v1i=1>

<http://pxwebapi2.stat.fi/PXWeb-PxGraf/sq/94788694-cff8-42b5-97be-d0e1296ed55f?v1i=3,5,8>

On the screen in PX-Web window (same base query):

<http://pxwebapi2.stat.fi/PXWeb-PxGraf/sq/fd32aea9-ea26-468c-b84e-c86782945fb8?type=screen&format=svg&v1c=H&v2i=2>

As a png file (same base query):

<http://pxwebapi2.stat.fi/PXWeb-PxGraf/sq/fd32aea9-ea26-468c-b84e-c86782945fb8?type=filed&format=png&v1i=2&v2i=2>

Browsable table view:

<http://pxwebapi2.stat.fi/PXWeb-PxGraf/sq/fd32aea9-ea26-468c-b84e-c86782945fb8?type=scroll&format=html&v1i=2&v2i=0>

Embedded table view without controls:

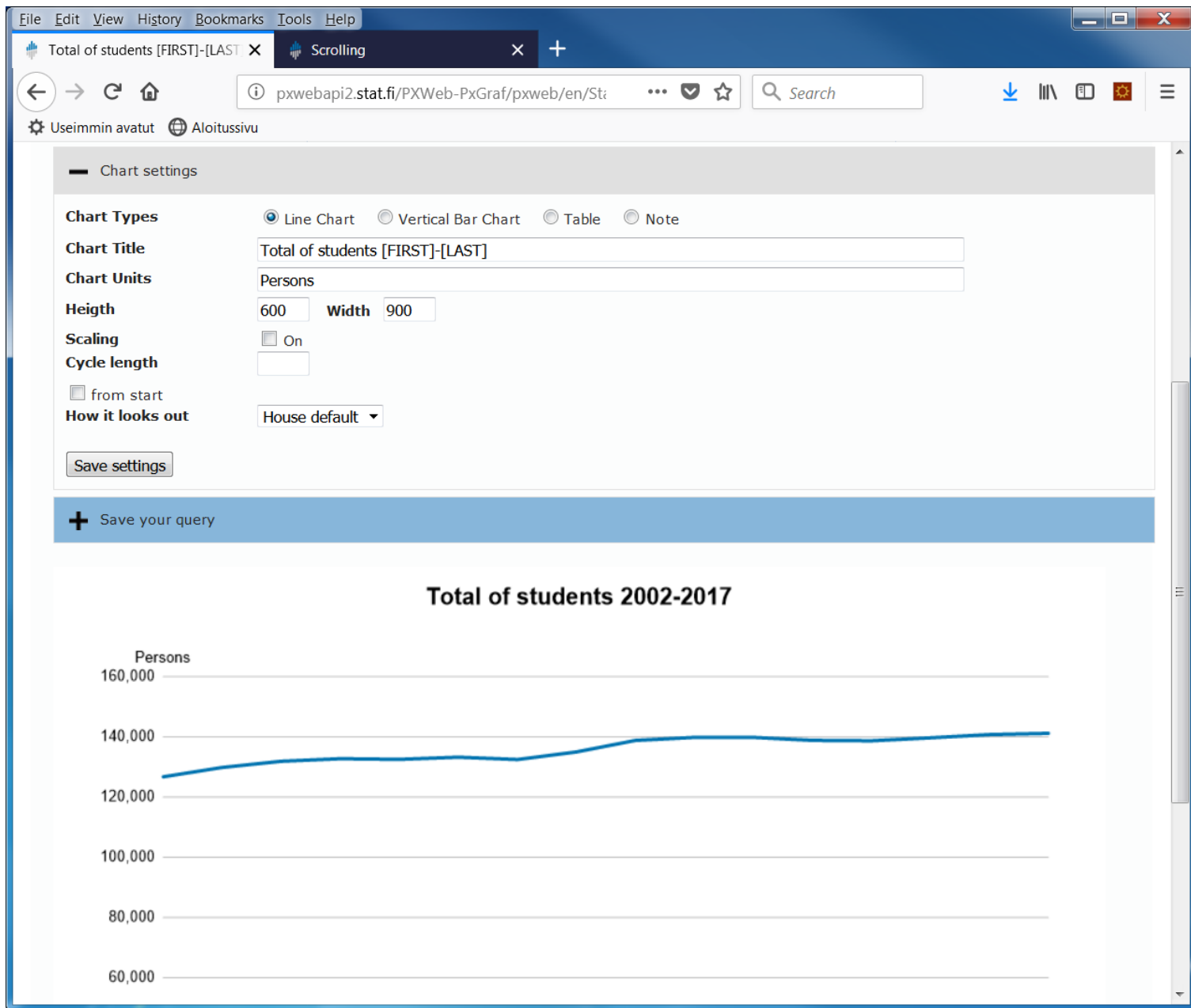
<http://pxwebapi2.stat.fi/PXWeb-PxGraf/sq/fd32aea9-ea26-468c-b84e-c86782945fb8?type=embed&format=html&v1i=2&v2i=0>

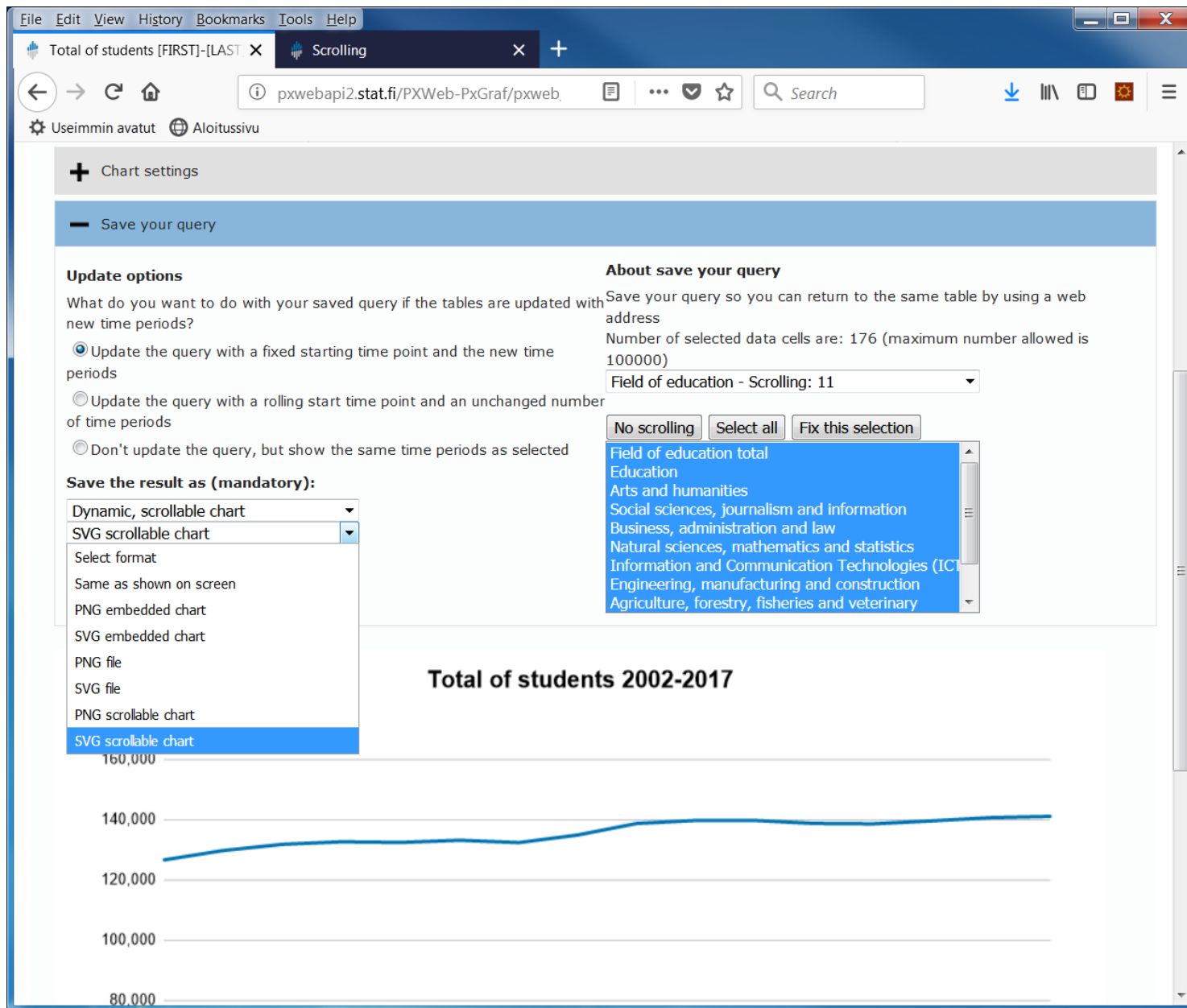
Some possible follow-up development

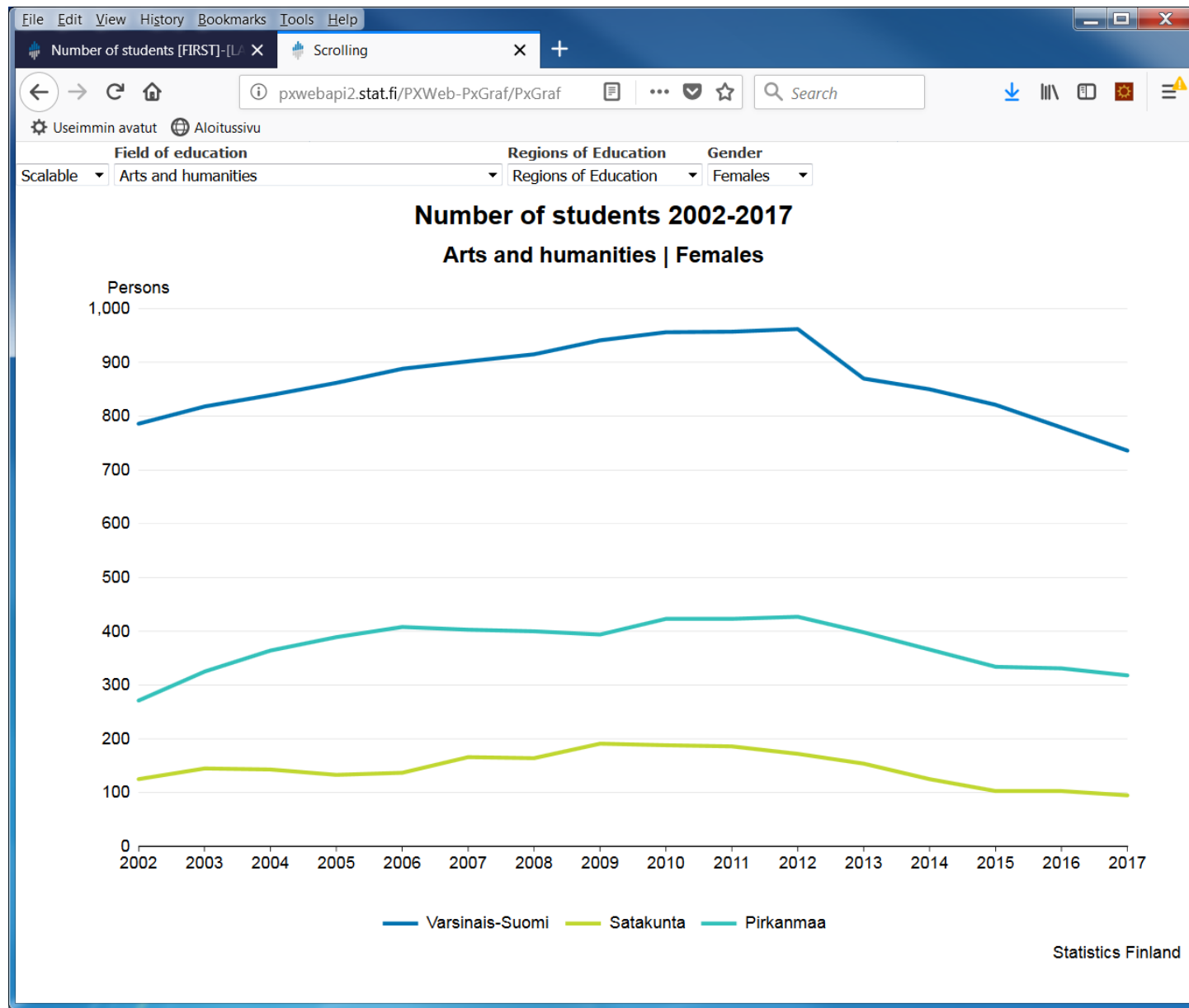
- Excel output for embedded graphs/tables
- PDF output for embedded graphs/tables
- Printable chart output (print button) for embedded graphs/tables
- Link to underlying database tables selection page with these selections highlighted
- Data included with embedded graphs/tables when using fixed (= not to be updated) selection → “archiving”
- Editor for multilinguality → title, unit and source
 - Language parameter for embedded graphs/tables
- Storing json query information alongside embedded graphs/tables (=table url, variable names, variable types, value codes)
 - material for our internal search engine
- **Editor for valuetexts!** ... (and possibility to edit them for all different languages too)?
- Better mouse-over functionality
- Aggregation files don't work with saved queries?

Connections to px file format

- VARIABLE-TYPE
 - Content
 - Time
 - Classificatory
 - Other
- ... or CONTVARIABLE and TIMEVAL
- Continuous → new keyword (true, false) ... or variable META-ID?
- Hierarchical → HIERARCHIES, HIERARCHYLEVELS?
- Region → MAP?
- Unit of measure of different CONTVARIABLE values?
 - quantity, %-share, %-change, indices → CONTVARIABLE values UNITS ... or ...
 - Additivity (true, false) → new keyword ... or value META-ID?
 - Negative balance (true, false) → new keyword ... or value META-ID?
 - Theoretical minimum value → new keyword ... or value META-ID?
 - Theoretical maximum value → new keyword ... or value META-ID?
 - Relevant threshold → new keyword ... or value META-ID?







File Edit View History Bookmarks Tools Help

Number of students [FIRST]-[L] X Scrolling X +

pxwebapi2.stat.fi/PXWeb-PxGraf/PxGraf

Useimmin avatut Aloitus sivu

Field of education Regions of Education Gender

Table Arts and humanities Regions of Education Females

Number of students 2002-2017

Arts and humanities | Females

	Varsinais-Suomi	Satakunta	Pirkanmaa
2002	786	125	271
2003	818	145	325
2004	839	143	364
2005	862	133	389
2006	888	137	408
2007	902	166	403
2008	915	164	400
2009	941	191	394
2010	956	188	423
2011	957	186	423
2012	962	172	427
2013	870	154	398
2014	850	125	366
2015	821	103	334
2016	779	103	331
2017	736	95	318

Statistics Finland