GradeMap Lite v4.2

Quick Start Guide

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Introduction

GradeMap Lite is a graphical, menu-driven software package combining a multidimensional IRT engine for estimating item and person parameters with tools for managing response data. The program provides a number of report options for interpreting the data at several levels of aggregation. Graphical maps and reports are designed for use in settings in which respondent progress on multiple measures can be examined and analyzed. Users can select expected a posteriori (EAP), maximum likelihood, or plausible value estimates of multivariate student proficiency. GradeMap Lite accepts dichotomous, rating scale, or partial credit items in between-item (each response is an indicator of a single dimension) or within-item (a response may be an indicator of multiple dimensions) multidimensional models.

GradeMap Lite also produces Wright maps that align person estimates with item estimates on a logit scale, and item characteristic and cumulative probability curves. It estimates item parameters using marginal maximum likelihood techniques. Integrals are approximated using either a Gaussian quadrature method or a Monte Carlo method (user-selected), with user-defined number of nodes and upper and lower bounds of the latent traits. Users may also define convergence criteria and iteration limits. Differential item functioning and item bias can be explored by partitioning the response data on user-defined grouping criteria. GradeMap Lite produces traditional item-analysis statistics, as well as item response modeling fit statistics.

Installing GradeMap Lite

1. Download GradeMap Lite from `http://bearcenter.berkeley.edu/GradeMap`. Both Windows and Mac versions are available.
2. Windows users should run the `gm42lite_init.exe` program to automatically install GradeMap Lite, the demonstration files, and the most recent release of Java onto your computer (if you know your computer already has Java 2 installed, you can run `gm42lite_update.exe` instead).
3. Mac users should launch `gm42lite_mac.zip`. You may refer to `http://docs.info.apple.com/article.html?artnum=25367` for more information about ensuring that you have the latest version of Java available on your system.
4. Selecting the defaults will install the complete system and place a shortcut on your desktop and in the Start Menu folder. The system is installed to `c:\Program Files\GradeMap42Lite` on Windows systems and placed in a new GradeMap42Lite folder on the desktop on Mac systems.

Starting GradeMap Lite

1. Start the program by launching **GradeMap42Lite** from the Desktop (or use **Start – Programs – GradeMap42Lite – GradeMap42Lite**). Mac users should launch the **GradeMapLite** program found the GradeMapLite folder within the Applications folder on the hard drive.
2. When prompted, enter “admin” as your user name and “bear” as your password, and then press **OK**.
3. If a previous version of GradeMap is detected, the program will give you the option of automatically updating the most recently accessed project to the v. 4.2 file format.

Using the Demos

Five demonstration projects are included with GradeMap Lite: Example 1 is a unidimensional dichotomous model, Example 2 is a unidimensional partial credit model, Example 3 is a unidimensional rating scale model, Example 4 is a two-dimensional dichotomous model, and the SEPUP Demo is a two-dimensional rating scale model. The projects include all of the population and item parameters to specify the models and are populated with student data. They can be used to try out the charts, maps, and other features of GradeMap Lite.

1. Select the **File** menu option and highlight the demo project you would like to try. To see maps and ability reports, the *SEPUP Demo* project might be the most interesting. To try item calibrating and see fit statistics, one of the other projects, such as *Ex2-Partial Credit* or *Ex4-Dichotomous MD*, would be appropriate.
2. Select **File – Save** to make the project available the next time you start GradeMap Lite.

Generating Reports and Maps

Detailed descriptions of the reports and ways to modify their settings are included in the *GradeMap Lite v4.2 User Guide*, which is available online at http://bearcenter.berkeley.edu/GradeMap. The following list is a brief overview of the most commonly used GradeMap Lite reports and features. You may want to use the *SEPUP Demo* project to explore the **Reports on Groups of Students** and **Reports on Individual Students** and the *Ex2-Partial Credit* or *Ex4-Dichotomous MD* demo to explore the **Item Analysis Reports**, **Estimation Options**, and **Model Settings**.

Report Options

The following functions begin at **Reports & Maps (try the SEPUP Demo data):**

Filter Students	User selects any number of demographic fields with which to select cases. These cases will be the only cases used to produce reports, estimates, etc. in subsequent menu selections. The ON or OFF status of filtering is displayed in the status line at the bottom of the display of cases on the screen. The filtering criteria appear in the title area of reports.
Report Options	Defines the way reports should look. Set Project Title, the maximum and minimum scale (by default these are the maximum and minimum of the logit range, but user can set any scale), and alternative names for the default case terminology. Users may prefer terms such as “Student” or “Respondent,” for example.

Reports on Groups of Cases

The following reports all begin at **Reports & Maps** – **Group Reports** (try the SEPUP Demo data):

Frequency Map	Frequency distribution of proficiency levels for all cases; one chart per variable. Shows counts or percentages.
Wright Map	Frequency distribution of proficiencies against item difficulties for all cases on the selected instrument(s) along a logit scale; one chart per variable.
Brief Ability Estimates Report	Shows ability estimate(s) and standard error(s) for each case. All variables shown on one report. Estimates and errors shown in user-defined scaling as an alternative to logit values.
Brief Ability Estimates Report by Level	For each Criterion Zone (i.e., ability level, refer to *Model Settings* below), shows ability estimate(s) and standard error(s) for each case. All variables shown on one report. Estimates and errors shown in user-defined scaling as an alternative to logit values.
Correlation Report	Shows correlations between raw scores, ability estimates, and user-selected demographic categories. Note that only binary demographic fields can be selected. You can limit a categorical demographic field to two categories by using the Filter Cases option first.

Reports on Individual Cases

The following reports all begin at **Reports & Maps** – **Individual Reports** (try the SEPUP Demo data):

Profile Map	Shows ability levels on each dimension on one chart. User must define Criterion Zones prior to requesting a Profile Map (see *Model Settings* below).
Item Tracking Map	Graphical representation of all items completed, score attained, and expected score for the case; a separate graphic is generated for each variable.
Kid Map	Shows scores respondent attained and did not attain in a format similar to a Wright Map. Helps the user identify unexpected performance on individual items.
Graphical Kid Map	Graphical representation of Kid Map data. User selects colors to indicate sectors on the map for the respondent's location range and unexpected response ranges.
Responses Report	Shows overall ability estimates and fit statistics, and responses on each item.

Item Analysis Reports

The following reports all begin at **Estimation Tasks** – **Results** (try the Ex2 or Ex4 data):

Wright Map	Frequency distribution of selected cases against item difficulties along a logit scale; one chart per variable. Items, steps, and Thurstonian thresholds are displayed.
Graphical Wright Map	Frequency distribution of selected cases against Thurstonian thresholds along a logit scale; one chart per variable. A separate column is provided for each item, with all Thurstonian thresholds for that item shown in the column. May display Criterion Zones if they are defined.
Item Estimates and Fit Graph	Shows item parameter estimates, errors, infit and t-statistics, outfit and t-statistics, and a graph showing the weighted mean squares (infits) for each item. User selects fit statistics by item or by parameter.
Classical Item Statistics	Shows counts, percentages, point biserial, average ability and standard deviations of abilities for each category on each item. Also displays item parameter estimates, Thurstonian thresholds, and fit statistics for each item.
Item Characteristic Curves	User selects the item and the logit range to be displayed. Shows probability curves for P(x=0), P(x=1), etc. The intersections of sequential curves indicate the locations of δ_{ij} parameters.
Item Cumulative Probability Curves	User selects the item and the logit range to be displayed. Shows cumulative probability curves for P(x=1 or higher), P(x=2 or higher), etc. The values at probability=.5 indicate the locations of Thurstonian thresholds for each category.
Test Information Curve	Plots the test information against proficiency locations for each variable.
Full Ability Estimates Report	Shows person proficiency, standard error, raw score and person fit statistics for each case. Averages, counts, variances, standard error of the mean, person separation reliability, maximum marginal likelihood reliability, and Cronbach's alpha are also reported. Separate reports for each variable.

Estimation Options

The following functions all begin at **Estimation Tasks:**

Calibration Options	Change integration method, number of nodes, logit ranges and convergence criteria for item parameter estimation.
Proficiency Estimation Options	Change proficiency type, integration method and nodes for person parameter estimation.
Compute Item Parameters	Estimates the model to produce population, item, and case estimates.
Filter Students for DIF Analysis	Computes parameters for a user-specified subset of the case data for DIF analysis. User selects the demographic field, minimum and maximum values to be included, and turns filtering on or off.

Model Settings
The following functions all begin at **System:**

Add Variable, Edit Variable & Criterion Zones	Add a new dimension to the model, or edit an existing dimension specification. Update means, covariances, maximum scores, criterion zones (cut-points), suggestions for improvement, etc.
Add Item	Creates a new item in the user-specified Item Set (instrument, assessment, activity, etc.). To EDIT an item, first select the Item Set it belongs to with **View – Select Item Set** so you can see it on the screen. Select the item by clicking on its column heading, then select the **Set Parameters** button. You can now edit or delete the item.
Add Demog. Field, Edit Demog. Field, Delete Demog. Field	Add a new demographic field to cases or edit or delete an existing demographic field.

Creating New Items

1. To create an item, select **System - Add Item** from the menu. The Item data entry window will appear.
2. **Select an Item Set** using the **Browse** button.
3. **Select a variable** from the pull-down list. Notice that a Max Score for the item will appear automatically.
4. Enter a **short name** and a **full name** for the item. Short names must be unique within the Item Set.
5. Change the **Max Score** value if necessary.
   Note: GradeMap Lite expects scores 0,1,2,3… to represent the 1st,2nd,3rd,…. score categories, so the Max Score value is related to the number of categories rather than actual score values.
6. Enter the item difficulty if it is known.
7. Enter the tau difficulties separated by commas if they are known.
8. Check the **Active Item** box to ensure that this item will be included in analyses and computations. Leave the Active Item box unchecked if you do not want the item to be included in the computations and analyses (i.e. if there is no data for the item).
9. Click **OK**.
10. Repeat steps 1-9 to add additional items
11. Save your work by selecting **File - Save** from the menu. This will also export your model specification (variables, items, etc.) into `items.txt` in the GradeMap42Lite folder.

Creating New Cases

Note: *We recommend that you import your respondent data from a tab delimited text file rather than enter it all manually (see the Importing Respondent Data section below). You may, however, wish to add a few cases manually, using the instructions that follow:*

1. Select **Edit - Add Respondent** (note that the term “Respondent” is set in the Report Options) from the menu. This will add a row to bottom of the table displayed on the main screen.
2. Enter the **name** of the respondent in the first column.
3. Enter **scores** corresponding to each item in the subsequent columns.

4. Repeat steps 1-3 for additional respondents.
5. Save your work by selecting **File - Save** from the menu. This will also export your response data into `students.txt` in the GradeMap42Lite folder.

Creating Import Files (Alternative to Manual Entry)

There are two methods for importing data into GradeMap. The usual method is import two files: the first is a model specification file and the second is the response data file. An alternative method for simple single-instrument, unidimensional models is to import one file that includes only response data. GradeMap determines the model from the data (note that these assumptions can be manually changed after the data is imported). Instructions for using the Simple Import method begin on page xx. Instructions for the standard method follow below.

Creating the Model Specification File (Variables, Items, Population data etc.)

Create the model specification file – the variable, item and population settings – in a tab-delimited format. We recommend that you use a spreadsheet such as Excel for creating the file (see `C:\Program Files\GradeMap42Lite\projects\` for several examples of `items.txt` files).

Each model specification component is entered on a single row, with each type of specification having its own format:

System/Model information (one row only, optional):

Column A	"s" (single lower case character)
Column B	Minimum scale value to display on graphs – correlates to min. logit.
Column C	Maximum scale value to display on graphs – correlates to max. logit.
Column D	Minimum logit value for estimation computations
Column E	Maximum logit value for estimation computations
Column F	Number of quadrature points for estimation
Column G	Model type, "r" = rating scale, "d" = dichotomous, "p" = partial credit, "m"=mixed dichotomous and partial credit

Variable entries (i.e., dimensions, constructs, progress variables, etc.)
(One row per variable)

Column A	"v" (single lower case character)
Column B	A short abbreviation for the variable.
Column C	A full title for the variable.
Column D	The maximum score for the variable (e.g., 4 indicates that scores 0-4 are valid).
Column E	The mean of the population distribution on the variable; optional.
Column F	The variance of the population distribution on the variable; optional.
Column G	The tau parameters for the variable (in a rating scale model), separated by commas (the number of parameters must equal the maximum score); optional. NOTE: This field should be in text format.
Column K	Covariances; optional. If multiple covariances are required, they should be comma-separated. This field should be in text format.

Item entries:
(one row per item)

Column A	"i" (single lower case character)
Column B	"base"
Column C	The short **variable** abbreviation to associate this item with a variable.
Column D	A short abbreviation to identify the item (this name will appear in the column heading for the Item Set in the data table; it only needs to be unique within the Item Set, however several maps and reports are easier

	to interpret when every item has a unique name). A length of 4-6 characters is recommended to keep the maps easy to read.
Column E	A full title for the item.
Column F	The (average) item difficulty. *Optional*.
Column G	Item comments. *Optional*.
Column H	Item administration date in mm/dd/yyyy format. **A blank entry indicates that the item is inactive and it will not be used in computing estimates**. This field should be in text format.
Column I	Tau parameters for the item, separated by commas (τ_j values rather than δ_{ij} values). The number of steps must equal the maximum score value for the item. This field should be in text format. *Optional*.
Column J	Maximum score for the item. If this field is left empty, the maximum score for the variable associated with the item will be used.

Save the file in tab-delimited text format.

Template for the Model Specification File

	A	B	C	D	E	F	G	H	I	J	K
1	s	min scale	max scale	min logit	max logit	nodes	type				
2	v	var short	var full	max score	mean	variance	taus				covars
5	i	base	var short	item short	item full	item diff	comments	active date	taus	max score	

Figure 1 is an example of a minimally defined model specification file. Only the variable and item definitions appear. GradeMap Lite will assume a partial credit model with one assessment stored in the default item set, named "base." The variable mean will be 0.0 and the variance will be 1.0. The item parameters will be set to 0.

	A	B	C	D	E
1	v	abil	ability	1	
2	i	base	abil	i1	item1
3	i	base	abil	i2	item2

Figure 1. Minimum model specification file for a unidimensional model.[1]

Figure 2 shows a more fully specified model. This specification defines a unidimensional dichotomous model using quadrature integration with 10 quadrature points to produce estimates. The reports will transform -3.0 to 3.0 logits to a scale of 1000 to 2000. The variable, "abil1" has a maximum score of 1, a mean of 0 and a variance of 1.0. Two items are defined; both are "active" and will be included in all estimations.

	A	B	C	D	E	F	G	H
1	s	1000	2000	-3.0	3.0	10	d	
2	v	abil	ability	1.0	0.0	1.0		
5	i	base	abil	i1	item1			1/15/05
6	i	base	abil	i2	item2			1/15/05

Figure 2. Model specification file for a unidimensional dichotomous model.

The `items.txt` files for Example 1 and Example 2 have simple model specifications, while the model specifications for Example 3, Example 4, and the SEPUP Demo project are more detailed. Examples 3 and 4 include a system specification row and the SEPUP Demo project includes a system specification row and Criterion Zone definitions.

Creating the Response Data File

Create the response data in a tab-delimited format. Again, we recommend that you use a spreadsheet for creating the file (see `C:\Program Files\GradeMap42Lite\projects\` for several examples of `students.txt` files).

The response data for each case is entered on a single row, with the item names used as column headings. The file should use the following format:

[1] The first row (A, B, C, D, etc.) and column (1, 2, 3, 4, etc.) should not be typed into your spreadsheet; they are shown here as a guide.

Required heading section (see Figure 3 below):

Row 1	The date the items were scored. The current date is recommended.
Row 2	"base" in each item column
Row 3	The *first* column should be entitled "Name". The *next set* of columns should indicate any demographic field names. The *final set of* columns should indicate an item short name.

Optional answer key section (see Figure 4 below)

Start the section with <ANSWERKEY> in the first column of a new row (include the < >). This will be the only entry on that row. Subsequent rows will contain the answer key specification. Create a separate row for each valid response value.

Column A	A valid student response from the student data file.
Columns B+	The recoded value for the student response for a particular item. For example, an "A" in column 1 might be scored as a 0 for item 1 and as a 1 for item 2. You need a separate row for each value you want to provide an answer key for. Use "." (without the quotes) to denote a missing score or a missing recoding for a particular item.

End the section with </ANSWERKEY> in the first column of a new row (include the < >).

Note: When an answer key is provided, unrecognized responses in the data file will be treated as missing data.

Optional demographics section (see Figure 5 below)

Start the section with <DEMOGRAPHICS> in the first column of a new row (including the < > delimiters). This will be the only entry on that row. Subsequent rows will contain demographic field specifications, one demographic field per row:

Column A	Demographic name
Column B	Default value for this demographic
Column C	`true` for a discrete field or `false` for continuous
Column D	`true` if users can add new categories or `false` if they cannot. An example of a demographic field that might need additional categories added later is Primary Language, where English and Spanish might be defined initially, but you may want to add other languages later.
Column E+	Categories this demographic has. Leave blank for continuous demographic fields or those that have no predefined categories. Separate predefined categories with commas, e.g., English, Spanish (for a demographic field for Primary Language).

End the section with </DEMOGRAPHICS> in the first column of a new row (including the < > delimiters).

Required student data section (one row per student):

Column A	Student name
Columns B+	Demographic and response data associated with the column headings.

Save the file in tab-delimited text format.

Figure 3 is an example of a response data file that might accompany the model specification file shown in Figure 1. Note that a "." represents a missing score. The Item Set is "base" with item short names of "i1" and "i2."

	A	B	C
1	12/12/04		
2		base	base
3	Name	i1	i2
4	Bruce	1	2
5	Aaron	2	2
6	Stacey	.	2
7	Amanda	2	1
8	Jason	3	3

Figure 3. Sample student data import file without optional sections.

Figure 4 is an example that includes an answer key section. In this example, a score of A+ on item i1 will be translated to a score of 3, and a score of A will be translated to a missing score. Scores of A or OK on item i2 will be translated to a score of 2.

	A	B	C
1	10/22/03		
2		base	base
3	Name	i1	i2
4	<ANSWERKEY>		
5	A+	3	3
6	A	.	2
7	B	2	1
8	OK	1	2
9	</ANSWERKEY>		
10	Bruce	OK	A
11	Aaron	B	A
12	Stacey	A	OK
13	Amanda	B	B
14	Jason	A+	A+

Figure 4. Sample student data import file with optional answer key section.

Figure 5 is an example that includes a demographic field section. Two demographic fields are defined: Class and Gender. In this example, Class represents the section the student is enrolled in. Gender is self-explanatory. Note on row 3 that Name does not have a default value, and it is identified as a discrete (categorical) field in which users can add new values. In row 4, Class is defined with no default value and is also identified as a discrete field in which users can add new values. Gender is defined in row 5, with a default value of "Male" and is also identified as a discrete field, but users cannot add values other than "Male" and "Female."

	A	B	C	D	E	F
1	10/22/03					
2	<DEMOGRAPHICS>					
3	Name		TRUE	TRUE		
4	Class		TRUE	TRUE		
5	Gender	Male	TRUE	FALSE	Male	Female
6	</DEMOGRAPHICS>					
7				base	base	
8	Name	Class	Gender	i1	i2	
9	Bruce	1	Male	1	1	
10	Aaron	1	Male	2	3	
11	Stacey	1	Female	3	2	
12	Amanda	2	Female	1	2	
13	Jason	2	Male	2	3	

Figure 5. Sample student data import file with optional demographics fields section.

The `students.txt` files for Example 1, Example 3 and the SEPUP Demo have simple response data. The response data for Example 2 includes demographic fields and the data for Example 4 includes an answer key.

Importing the Data using the Standard Method

1. If another project is active, export the data (see page 14) and then select **File – New Project**.
2. Select **System - Import Model Specification** from the menu.
3. Browse to the tab-delimited model specification file you created and click **Open**. Note: The system will report any difficulties encountered during the import process by displaying them on the screen and also writing them to a file named `filename_Errors.txt`. This error file will be located in the `logs` folder.
4. Select **File – Save** from the menu.
5. Select **File - Import Student Data** from the menu.
6. Browse to the tab-delimited **student data file** you created in the previous section and click **Open**. Note: The system will report any difficulties it encountered during the import process by displaying them on the screen and also writing them to a file named `filename_Errors.txt`. This error file will be located in the `logs` folder.
7. When the importing process finishes, your data will be displayed in the GradeMap Lite window. Select **File – Save**.

Simple Import

Response data for a simple import must be consistent with the following assumptions that are applied by GradeMap Lite:

- Items are from a single instrument;
- The items are indicators of a single latent trait;
- The responses are integers from 0 through 9; and
- All valid responses are represented in the data (i.e., no categories are omitted).

1. Create the response data in a text format (not tab-delimited). We recommend that you use a text editor, such as Notepad or SimpleText, to create the file (see `C:\Program Files\GradeMap42Lite\projects\ simple_import\simple_import.txt` for an example).

   The first row in the file defines the format of the data by specifying the column in which response data begins and the number of items. The response data is then entered as single-digit numerical values, with the data for each case entered on a single row. In the example shown in Figure 6, the data located in columns 1-4 is ignored and the responses are imported from columns 5-23.

   GradeMap Lite imports all of the data for each item and then interprets the range of valid score values. GradeMap only recognizes contiguous responses for each item. It then maps the lowest-numbered contiguous responses to scores starting at 0. In Figure 6 the first item shows responses of 7, 2, and 1. GradeMap translates the 1 to a 0, the 2 to a 1, and the 7 is considered missing data because it is not contiguous with the 1 and 2. The third item shows responses of 1, 2, and 3 and GradeMap translates these to scores of 0, 1 and 2. The fourth item shows responses of 2, 3, and 4, which are also translated to scores of 0, 1 and 2. If an item has two sets of continuous data, for example 1 through 3 and 7 through 9, only the first set are considered score values while the second set are considered missing data.

```
item_start 5 item_count 19
1012711222001232122112 2
1022223422313233422233 2
1032123221313233422233 2
1042123221322133312222 2
1052233222232334222232
1062222412312233422233 2
```

Figure 6. Data for a simple import file.

2. If another project is active, export the data (see page 14) and then select **File – New Project**.
3. Select **File – Simple Import**.
4. Browse to the file you created and click **Open**.
5. When the importing process finishes, your data will be displayed in the GradeMap Lite window. Select **File – Save.**

Computing Item Parameters

If you did not enter item and step difficulties in the model specification file you **must** calculate them before GradeMap Lite can display any maps or analytical reports.

1. Select **Estimation Tasks – Calibration Option**s from the menu. Enter values for integration method, nodes, logit range, and convergence criteria as needed.
2. Select **Estimation Tasks - Compute Item Parameters** from the menu.
3. When asked if you want to accept the parameters, select **Yes**.
4. When asked if you would like to have the final EAP estimates saved, select **Yes**.
5. Your data is now ready for generating reports and maps.

NOTE: If the **Yes No** buttons are not visible, press the **Enter** key for **Yes** or press the **tab** key and then the **Enter** key for **No**. (For Mac users, press **tab tab space** for **Yes** and press **tab tab tab space** for **No**.)

Computing Proficiency Estimates

A number of reports compute proficiency estimates automatically (Wright Maps, Ability Estimates, Kid Maps, etc.). The estimates are computed using information contained in the **Estimation Tasks – Proficiency Estimation Options** data entry window. In particular, you should use this window to select the estimation type (EAP, MLE, DPV) and the integration method (quadrature or Monte Carlo).

Importing Matrices

You may also import scoring, design and xi matrices to compute proficiency estimates (these cannot be used to compute item parameters at this time). Importing parameters is required for within-item multidimensional models in the current version of GradeMap Lite. Note that the design matrix must define every parameter, as the computation does not assume any constrained values. The rows on the scoring matrix must be aligned with the rows on the design matrix, and the number of rows in the xi matrix (the xi matrix has only one column) must match the number of columns in the design matrix. For more information about constructing these matrices, see *Constructing measurement models for MRCML estimation: A primer for using the BEAR scoring engine (Kennedy, 2005) at http://bearcenter.berkeley.edu/publications/ConstructingMeasures.pdf.*

Design Matrix

The number of columns is equal to the total number of item parameters in the model. The number of rows is equal to the sum of the number of categories for each item. Each value on a row is separated by a space, and values should be positive real numbers (zero and whole numbers are o.k. and do not require decimal points).

The design matrix begins with two rows that describe the matrix. One row describes the contents of the columns and the other describes the contents of the rows (these can appear in either order). Use the key word “cols = “ to describe the order of the item parameters and “rows = “ to describe the order of the items. Values following the “= “ are separated by spaces. Items are identified by their “item ID” value, which can be found in the Item view of the data (use the Item tab at the bottom of the data view). Parameter types include “d*i*” for average item difficulty, “d*i.j*” for the difficulty of step *j* on item *i* (for partial credit models), “t*i.j*” for the tau *j* difficulty of item *i* for partial credit models or for the tau *j* difficulty of variable *i* for rating scale models (e.g., a unidimensional rating scale model with 3-cateogry items would use t1.1 and t1.2).

Unidimensional model with 5 dichotomous items:

cols = d1 d2 d3 d4 d5
rows = 1 2 3 4 5

This design matrix will have 5 columns and 10 rows.

Unidimensional model with 5 3-category partial credit items (δ_{ij} notation):

cols = d1.1 d1.2 d2.1 d2.2 d3.1 d3.2 d4.1 d4.2 d5.1 d5.2
rows = 1 2 3 4 5

This design matrix will have 10 columns and 15 rows.

Unidimensional model with 5 3-category partial credit items (τ notation, Conquest’s native output format):

cols = d1 d2 d3 d4 d5 t1.1 t1.2 t2.1 t2.2 t3.1 t3.2 t4.1 t4.2 t5.1 t5.2
rows = 1 2 3 4 5

This design matrix will have 15 columns and 15 rows.

Unidimensional model with 5 3-category rating scale items:

cols = d1 d2 d3 d4 d5 t1.1 t1.2
rows = 1 2 3 4 5

This design matrix will have 7 columns and 15 rows.

Multidimensional model with 5 3-category rating scale items, two items for variable 1 and one for variable 2:

cols = d1 d2 d3 d4 d5 t1.1 t1.2 t2.1 t2.2
rows = 1 2 3 4 5

This design matrix will have 9 columns and 15 rows.

Scoring Matrix
The number of columns is equal to the total number of variables in the model. The number of rows is equal to the sum of the number of categories for each item (and equal to the number *and order* of the rows in the design matrix). Each value on a row is separated by a space, and values should be real numbers (zero and whole numbers are o.k. and do not require decimal points).

Xi (item parameter) Matrix
The number of rows is equal to the total number of item parameters in the model (and equal to the number *and order* of the columns in the design matrix). The matrix has one column. Each value should be real number (whole numbers are o.k. and do not require decimal points).

Example: Generating a Full Ability Estimates Report using imported matrices

1. Select **File – New Project** from the menu. Answer **Yes** when prompted.
2. Select **System – Import Model Specification** and browse to the `items.txt` file in the `within_md` folder in the `projects` folder.
3. Select **File – Import Student Data** and browse to the `students.txt` file in the `within_md` folder in the `projects` folder.
4. Select **File – Save** to save the new project.
5. Select **Estimation Tasks – Results – Full Ability Estimates Report** from the menu.
   - Enter values for the report title, location of the output file, and item set.
   - Select **Yes** for the Student Detail option to see the student proficiency estimates and fit statistics.
   - Select **Yes** for the Import Matrices option.
   - Select **Yes** for the Show Estimation Type option.
   - Click the **OK** button to continue.
6. You should see the Import Matrices data entry window. Use the **Browse**... buttons to select the design matrix, scoring matrix, and xi (ξ) matrix locations. You MUST import all three matrices.
7. Your report will now be generated.

Currently, the reports that can use imported matrices are:

- Brief Ability Estimates Report
- Brief Ability Estimates Report by Level
- Full Ability Estimates Report

Exporting Your Data

You can export your current project data to use GradeMap Lite for multiple projects. Currently, GradeMap Lite is designed to recognize one project at a time, so importing new model and student data deletes the current project from the system. To save the data, you can export both the model specification and the student data to a separate directory. This data can then be imported back into GradeMap Lite when you need it again.

1. Select **System – Export Model Specification**.
2. Browse to the folder where you want the data stored and provide a filename. We recommend that you create a new folder within the `projects` folder for each of your projects. Click on **Save**.
3. Select **File – Export Student Data**.
4. Browse to the folder where you want the data stored and provide a filename. Click on **Save**.

Appendix A – GradeMap Lite Menu Options

File
- Save
- ---
- Simple Import
- Import Student Data
- Export Student Data
- ---
- Setup Ex 1 – Dichotomous
- Setup Ex 2 – Partial Credit
- Setup Ex 3 – Rating Scale
- Setup Ex 4 – Dichotomous MD
- Setup SEPUP Demo
- New Project
- ---
- Exit

Edit
- Add Student
- Delete Student

View
- Select Demographic Columns to Display
- Display Excluded Column
- Show Filtered Students Only
- Show Recoded Values

Reports & Maps
- Filter Students
- Group Reports
  - Frequency Map
  - Wright Map
  - Brief Ability Estimates Report
  - Brief Ability Estimates Report by Level
  - Correlation Report
- Individual Reports
  - Profile Map
  - Item Tracking Map
  - Kid Map
  - Graphical Kid Map
  - Responses Report
- ---
- Report Options

Estimation Tasks
- Calibration Options
- Proficiency Estimation Options
- ---
- Compute Item Parameters
- Filter Students for DIF Analysis
- Results
  - Default
  - ---
  - Wright Map
  - Graphical Wright Map
  - Item Estimates and Fit Graph
  - Classical Item Statistics
  - ---
  - Item Fit Graph of Items
  - Item Fit Graph of Steps
  - Item Characteristic Curves
  - Item Cumulative Prob. Curves
  - Test Information Curve
  - ---
  - Full Ability Estimates Report
  - Correlation Report
- ---
- Export Conquest Files
- Execute Conquest
- Import Conquest Parameters

System
- Add Variable
- Edit Variable & Criterion Zones
- ---
- Add Item
- ---
- Add Demog. Field
- Edit Demog. Field
- Delete Demog. Field
- ---
- Import Model Specification
- Export Model Specification
- ---
- Change Password