GAUGING MOOC LEARNERS' ADHERENCE TO THE DESIGNED LEARNING PATH

DAN DAVIS, GUANLIANG CHEN, CLAUDIA HAUFF, GEERT-JAN HOUBEN

TU DELFT

WEB INFORMATION SYSTEMS GROUP

WHAT IS A ***LEARNING PATH ?***

*WHAT IS A **LEARNING PATH** ?*

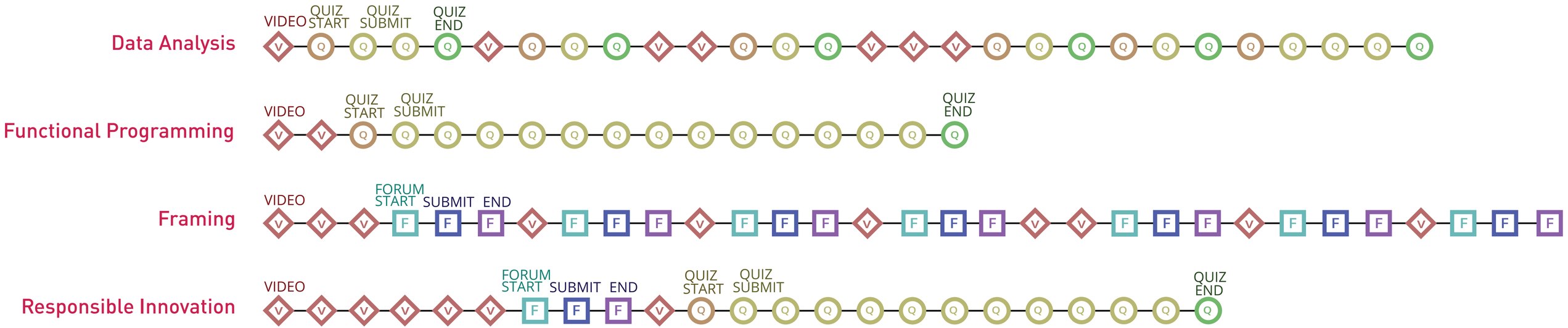
THE **SEQUENCE** OF EVENTS A STUDENT TAKES
TOWARDS A LEARNING OBJECTIVE

RQ

to what extent do learners adhere to the designed learning path?

VIDEO	QUIZ	PROGRESS	FORUM
WATCH	START	VIEW	START
	SUBMIT		SUBMIT
	END		END

DESIGNED LEARNING PATHS



RELATED WORK

Demographic differences in how students navigate through MOOCs. In *L@S '14*

PHILIP GUO & KATHARINA REINECKE

Identifying latent study habits by mining learner behavior patterns in massive open online courses. In *CIKM '14*

MIAOMIAO WEN & CAROLYN ROSÉ

MOOC	ENROLLED	PASS RATE	CHAINS PASS/NON	QUIZ QUESTIONS	TRIES	VIDEOS ACCESSED*
FP101x	37k	5.3%	1.06M/807K	288	1	67.5%
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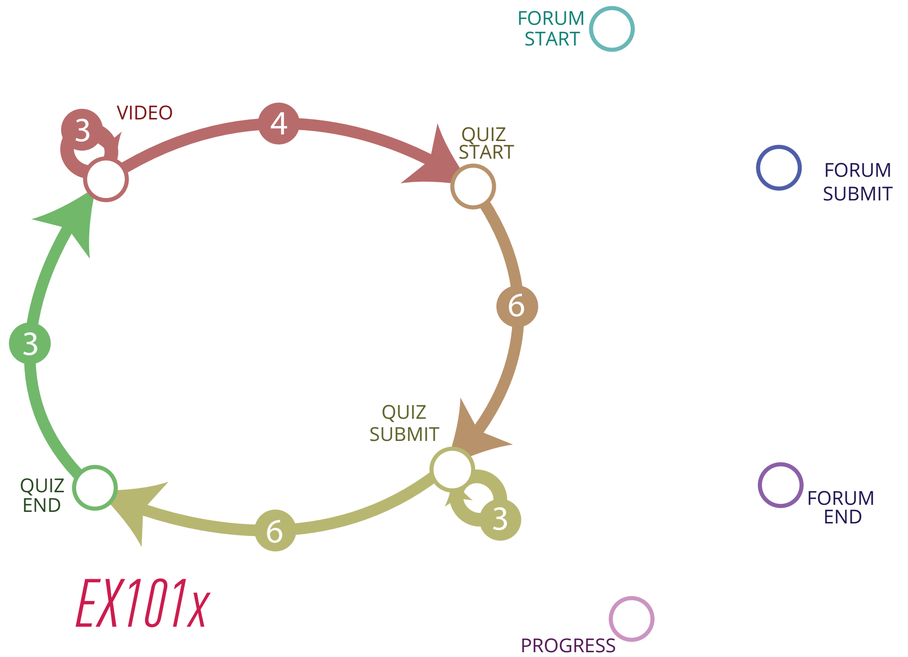
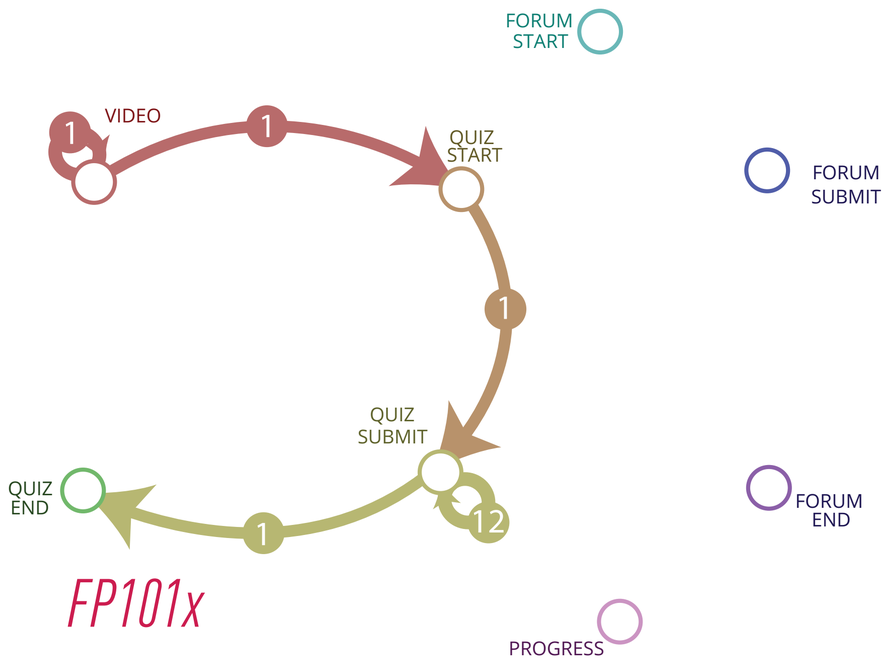
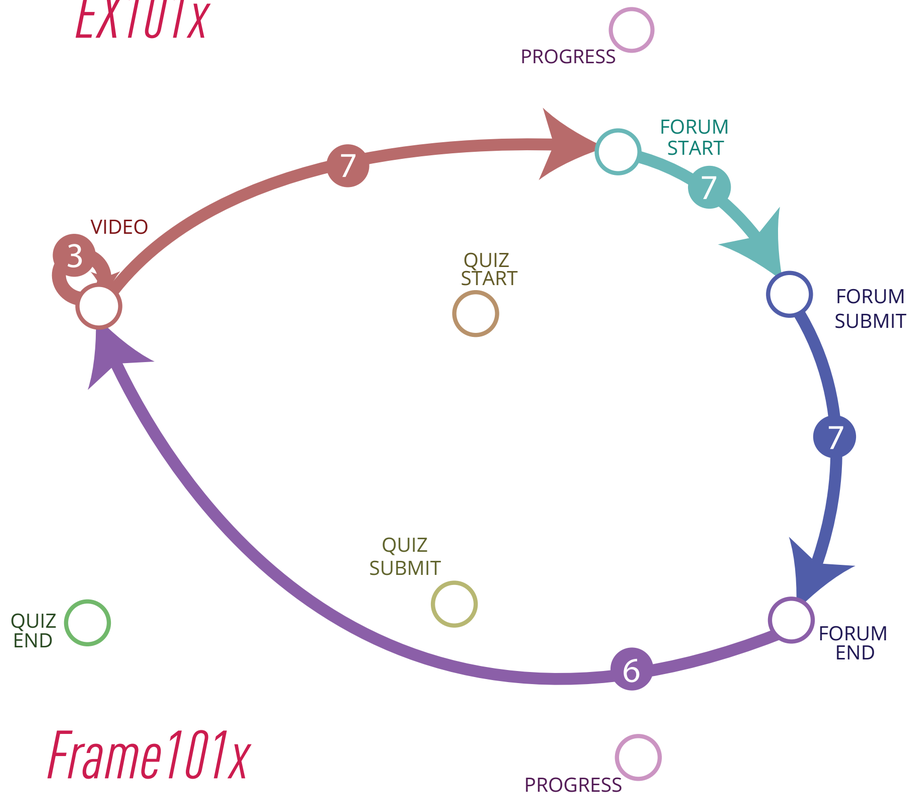


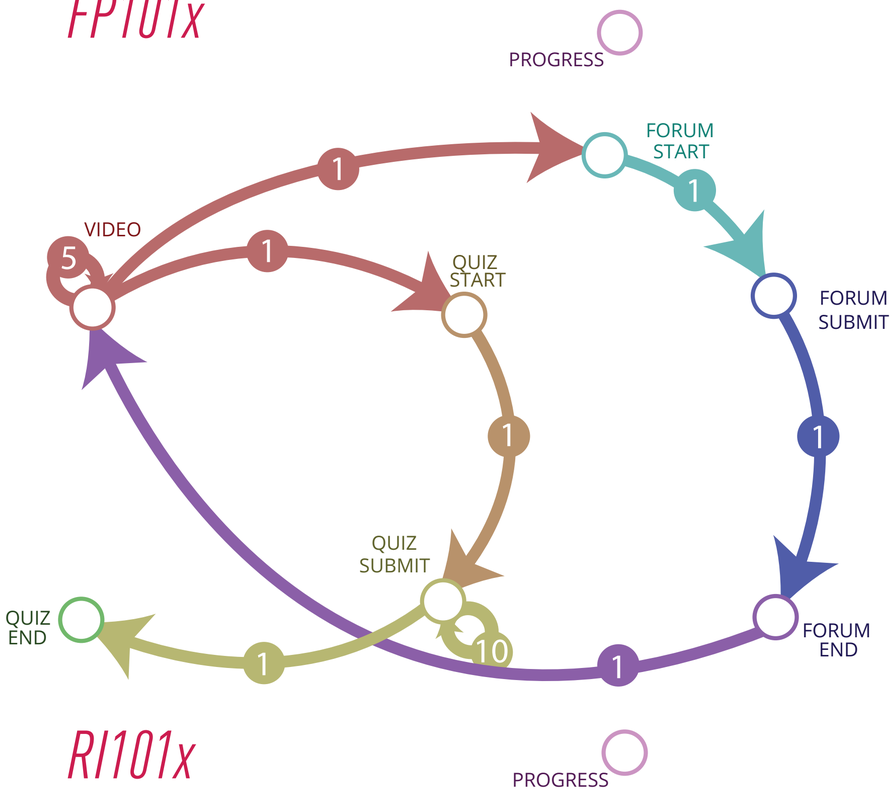
EX101x



FP101x

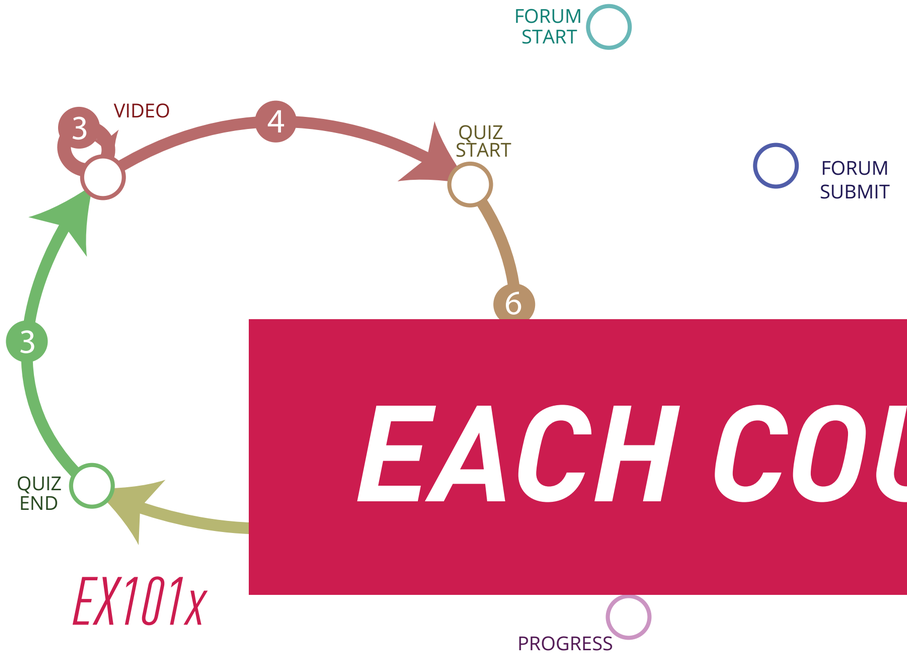


Frame101x

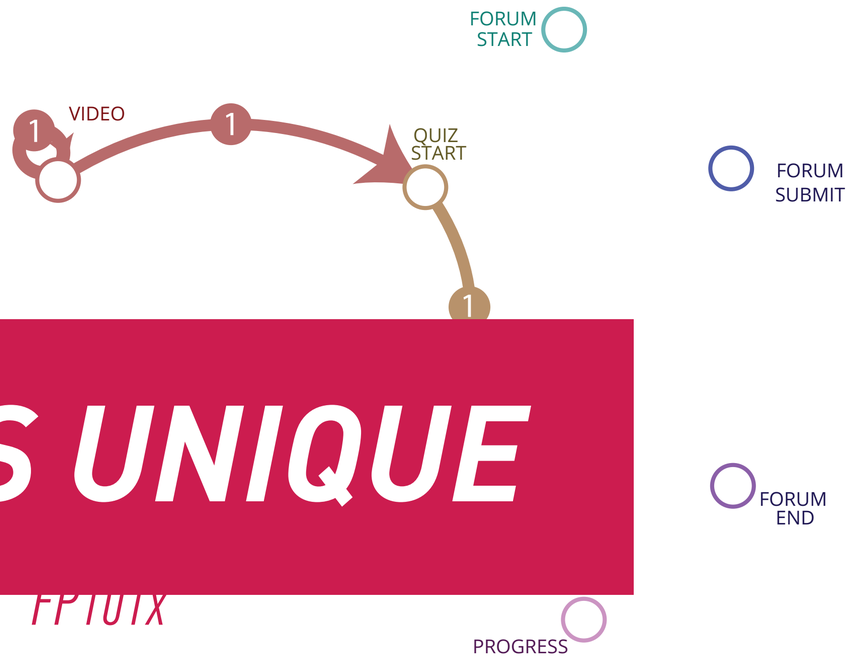


RI101x

EACH COURSE IS UNIQUE



EX101x



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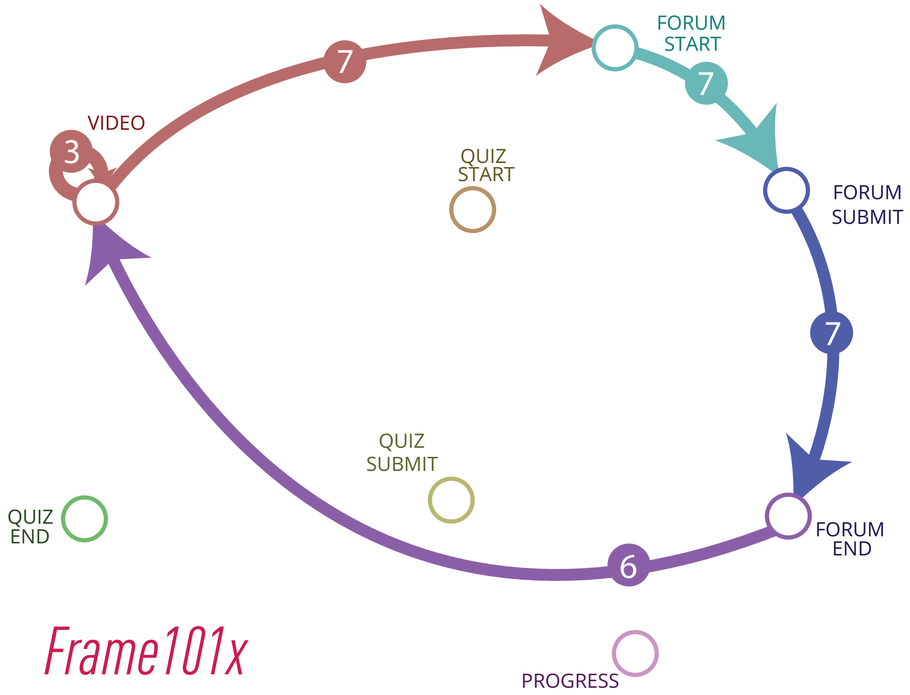

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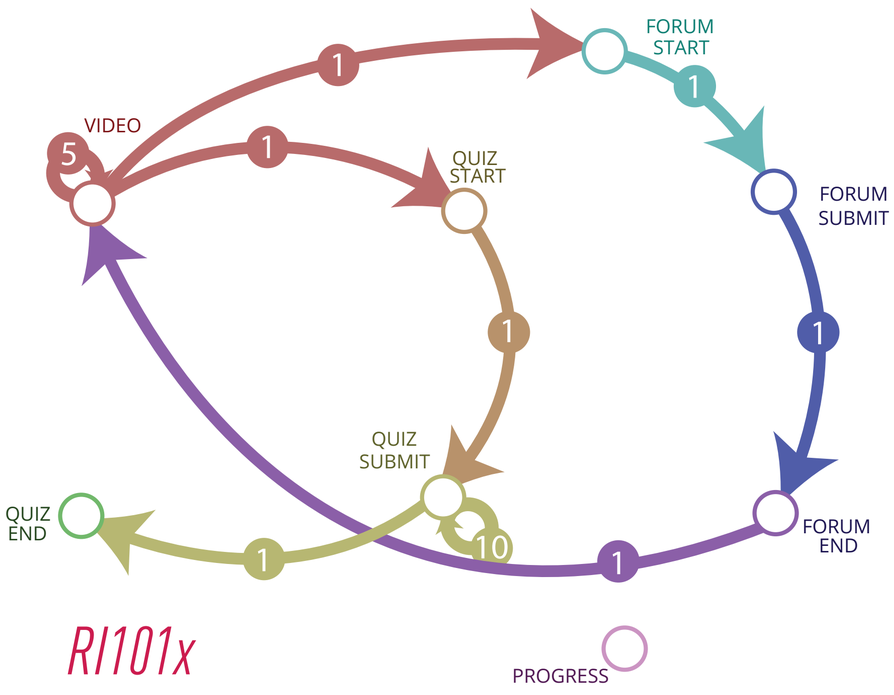

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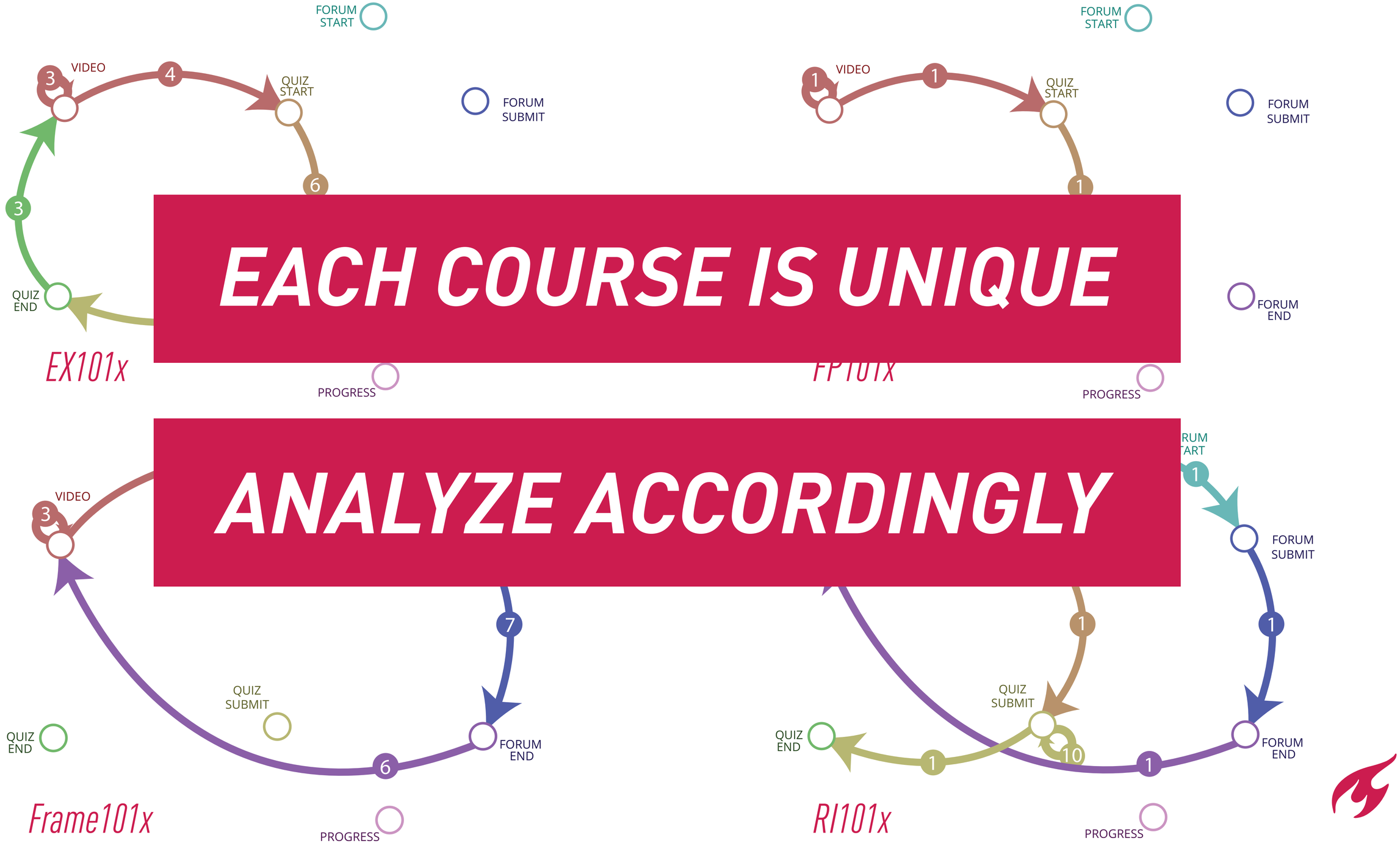
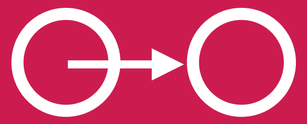
ANALYZE ACCORDINGLY



APPROACH

1. VIDEO INTERACTIONS

2. BEHAVIOR PATTERN CHAINS



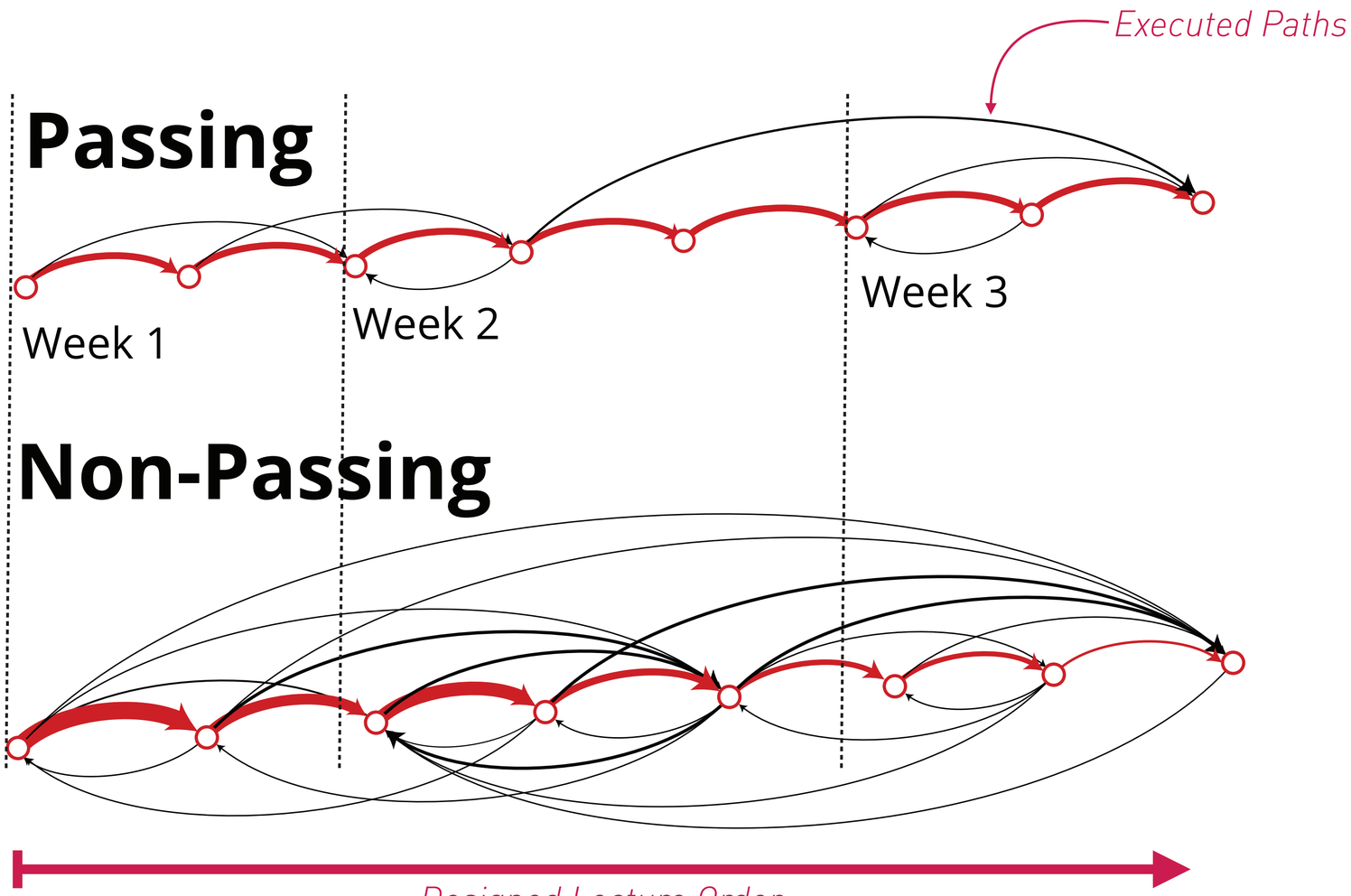
3. EVENT TYPE TRANSITIONS

FINDINGS

1. VIDEO INTERACTIONS

DO LEARNERS WATCH VIDEO LECTURES IN THE PRESCRIBED ORDER?

VIDEO INTERACTIONS



FP101x

VIDEO INTERACTIONS

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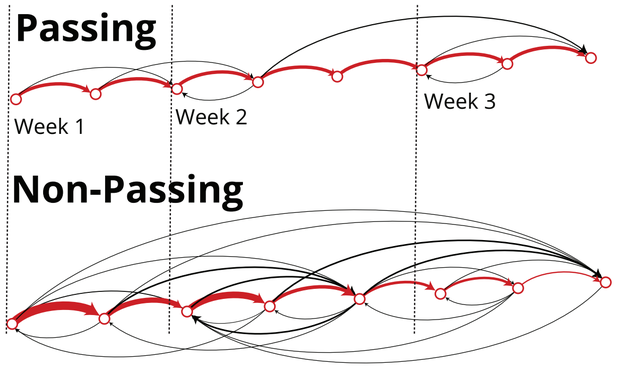

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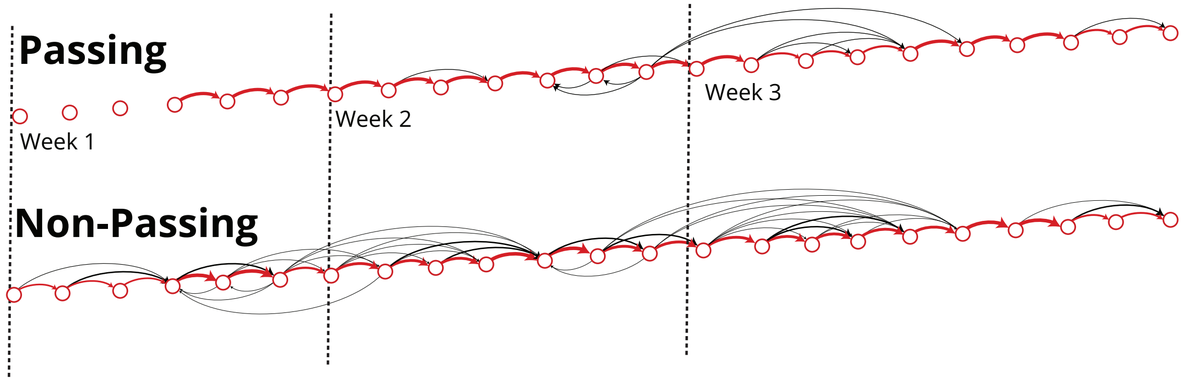

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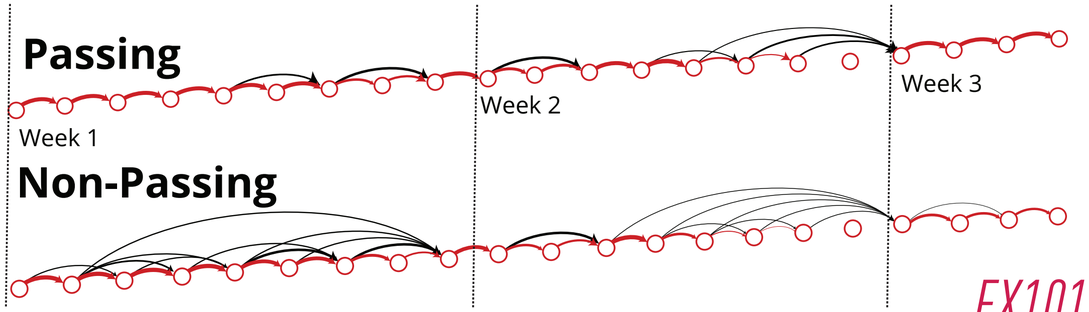
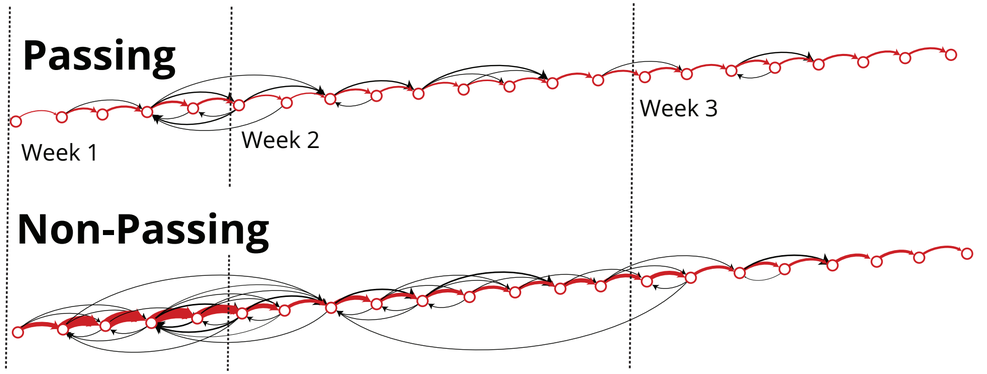


EX101x



2. BEHAVIOR PATTERN CHAINS

WHAT ARE THE MOST COMMON SEQUENCES IN THE EXECUTED LEARNING PATHS?

EXAMPLE
EIGHT-STEP CHAIN

$FORUM_{END}$ → $LECTURE_{WATCH}$ → $QUIZ_{START}$ → $QUIZ_{SUBMIT}$ → $QUIZ_{SUBMIT}$ →

$QUIZ_{END}$ → $PROGRESS$ → $LECTURE_{WATCH}$

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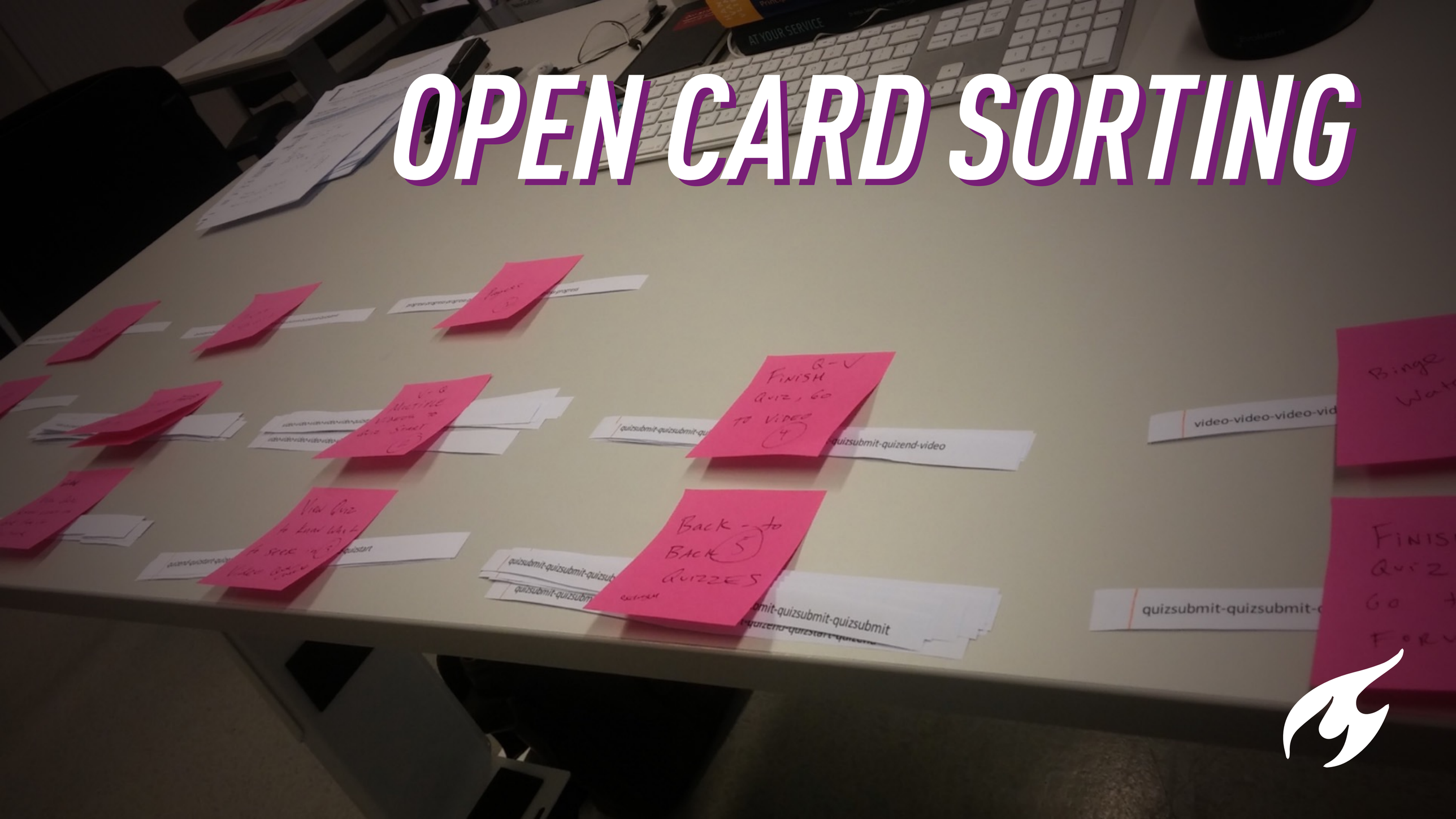
OPEN CARD SORTING

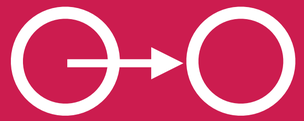


MOTIF

A RECURRING OR REPEATED ELEMENT

FP101x

MOTIF	FREQ TOTAL	FREQ PASS	FREQ FAIL
1. ***QUIZ COMPLETE*** X_{QUIZ} events only with at least 1 X = *SUBMIT*	552,363 (29.4%)	328,995 (30.8%)	223,368 (27.7%)
2. ***BINGE WATCHING*** WATCH events only	149,784 (8%)	59,498 **(5.6%)**	90,286 **(11.2%)**
3. ***LECTURE -> QUIZ COMPLETE*** WATCH event(s) followed by X_{QUIZ} events w/ >1 X = *SUBMIT*	100,179 (5.3%)	50,415 (4.7%)	49,764 (6.2%)
4. ***QUIZ COMPLETE -> FORUM*** X_{QUIZ} events w/ >1 X = *SUBMIT* followed by X_{FORUM} events	99,828 (5.3%)	67,722 (6.3%)	32,106 (4%)

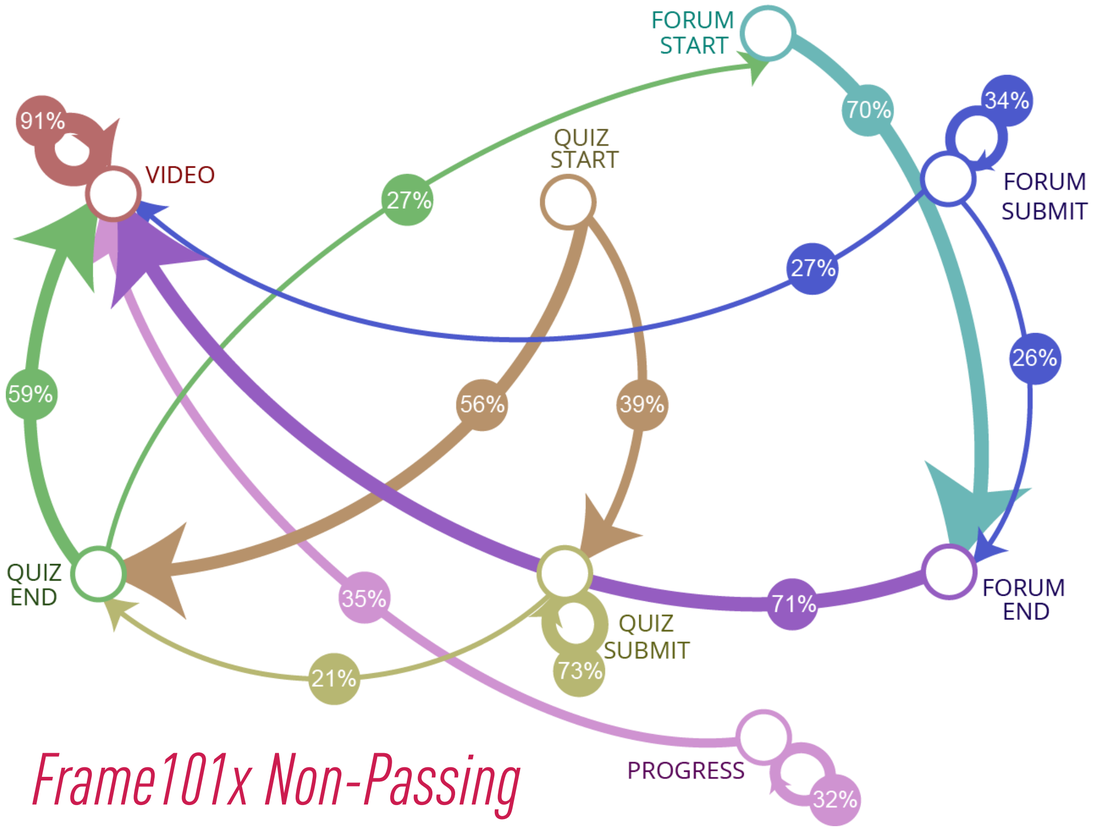


3. EVENT TYPE TRANSITIONS

HOW DO STUDENTS NAVIGATE BETWEEN CERTAIN EVENT TYPES?

EVENT TYPE TRANSITIONS

(EXECUTED)

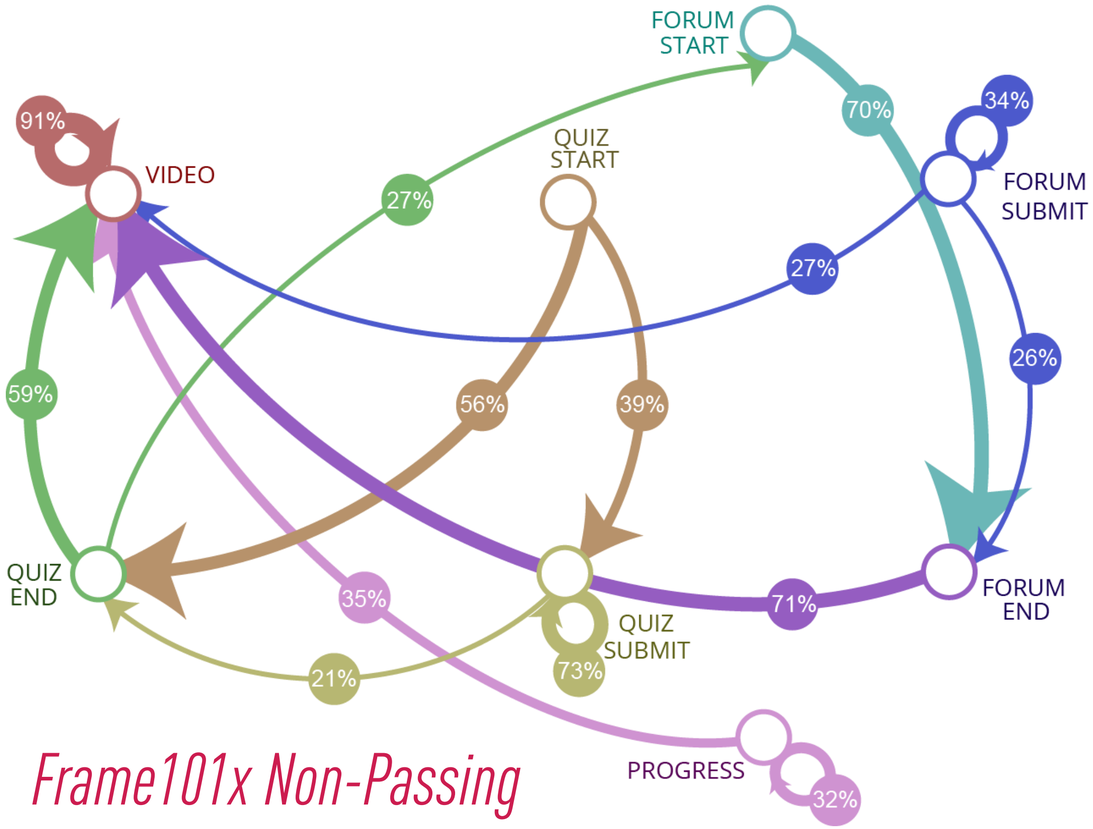


Frame101x Non-Passing

Markov Model
State Visualization

EVENT TYPE TRANSITIONS

(EXECUTED)



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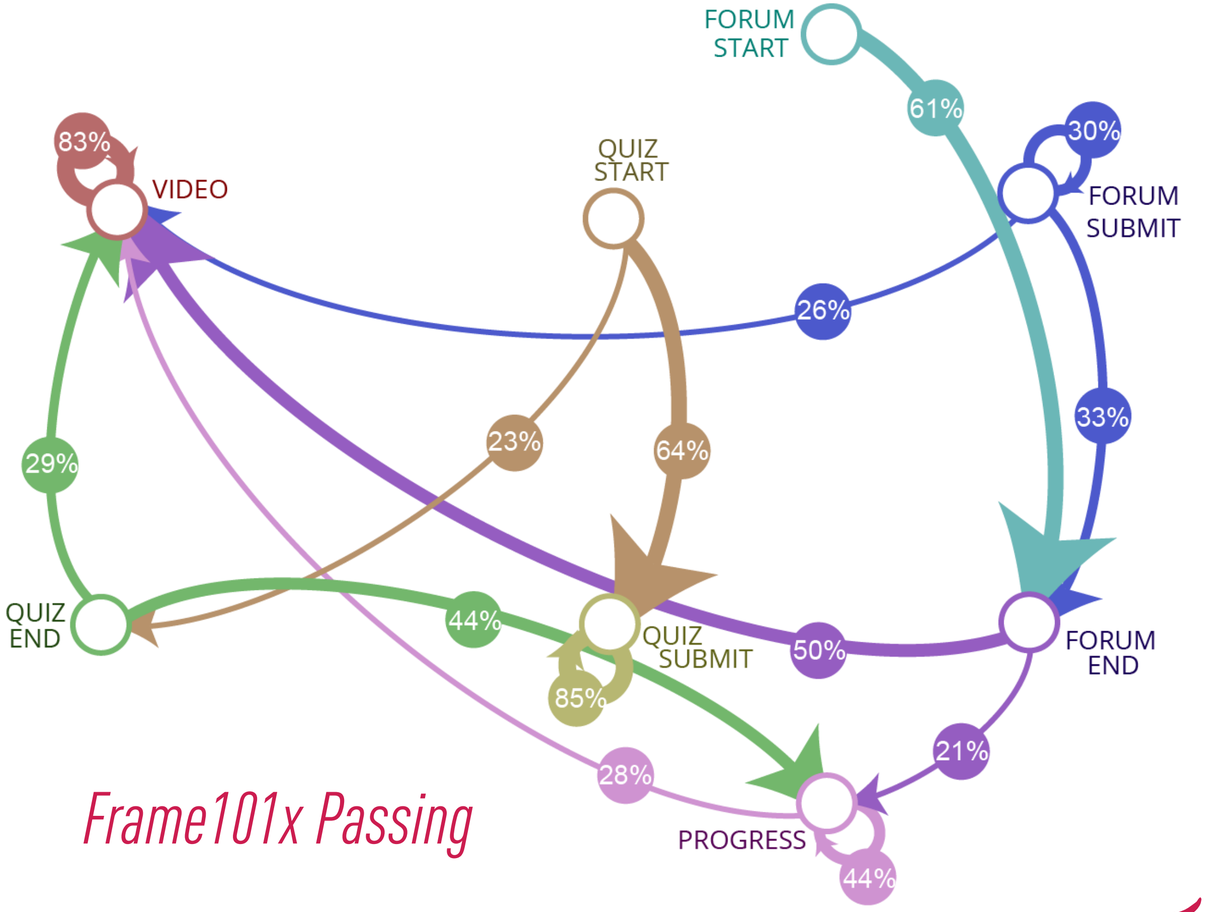

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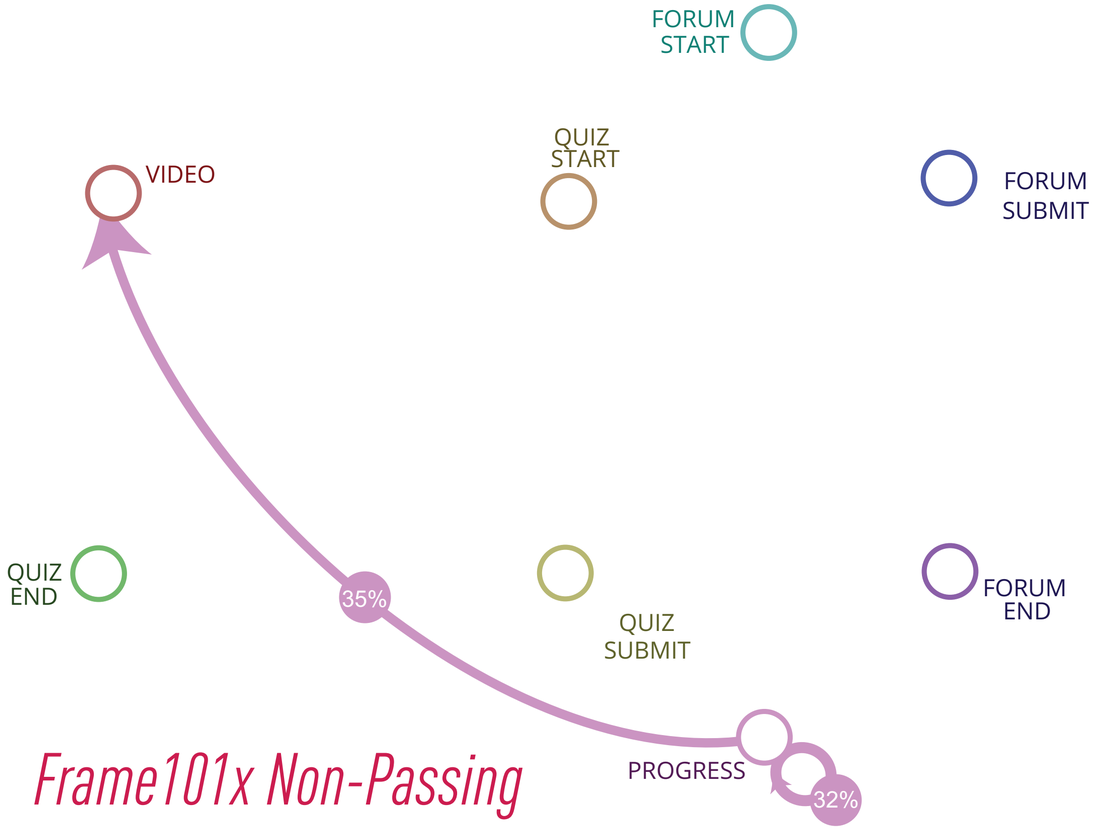

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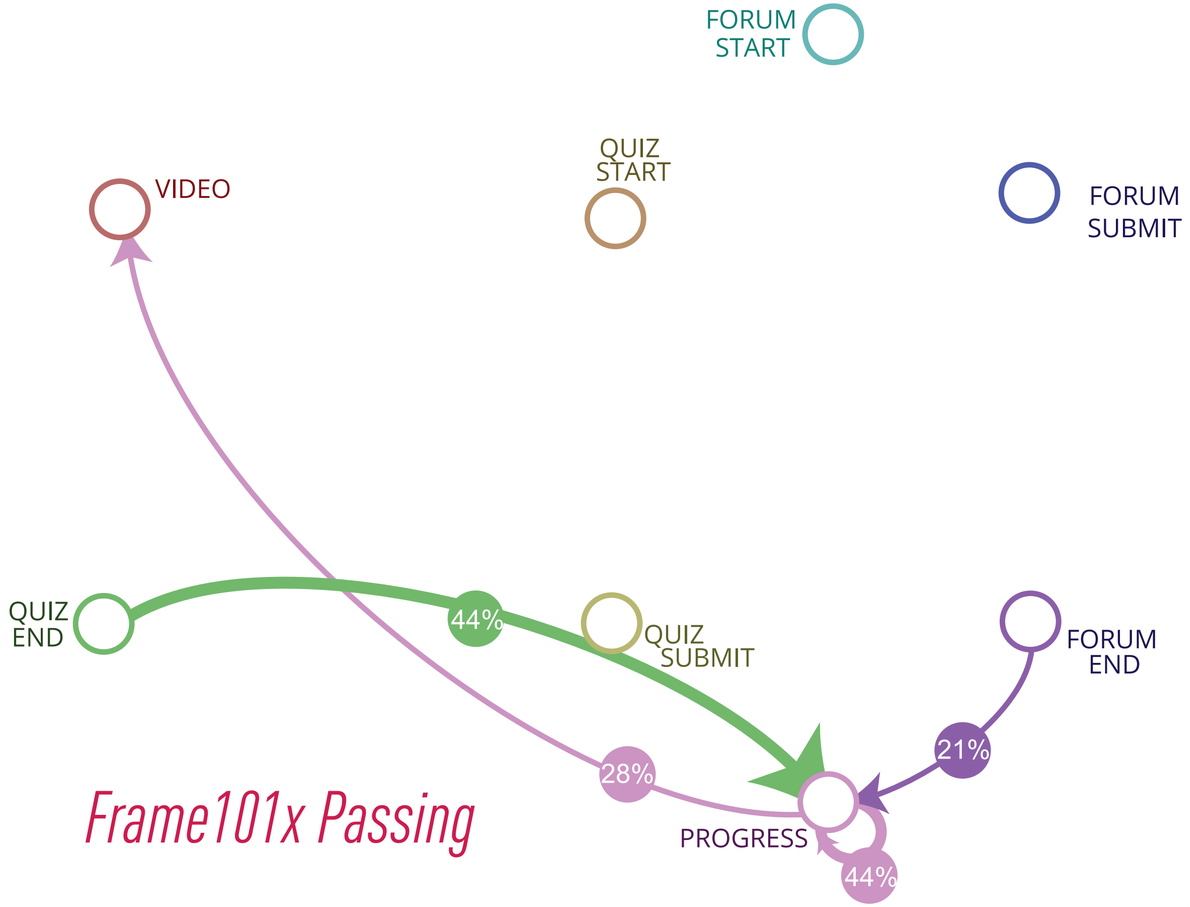
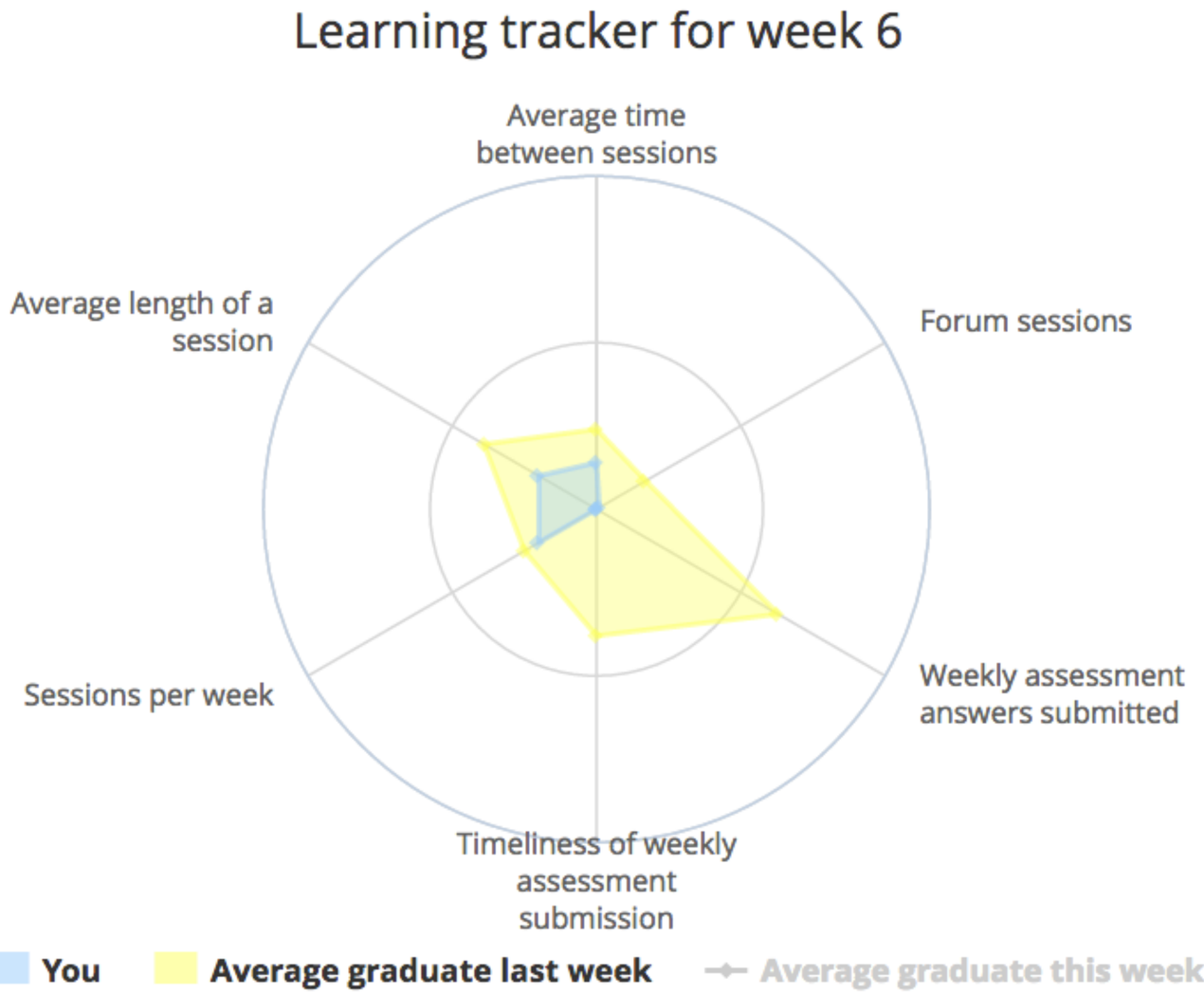
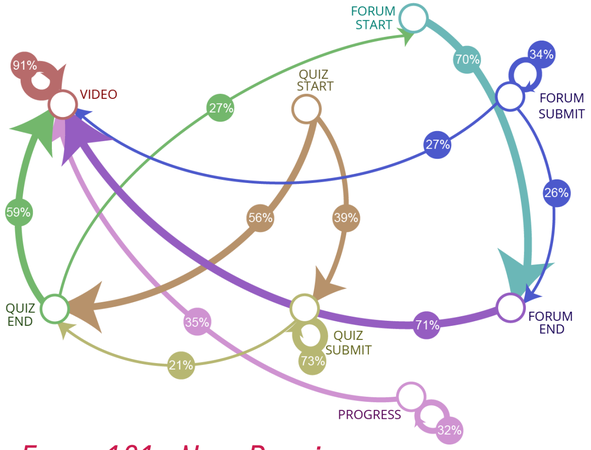


Frame101x Passing

EXAMPLE **FEEDBACK**



DAVIS, D., CHEN, G., JIVET, I., HAUFF, C., & HOUBEN, G. J. (2016). ENCOURAGING METACOGNITION & SELF-REGULATION IN MOOCS THROUGH INCREASED LEARNER FEEDBACK. *LAK 2016 LAL WORKSHOP*



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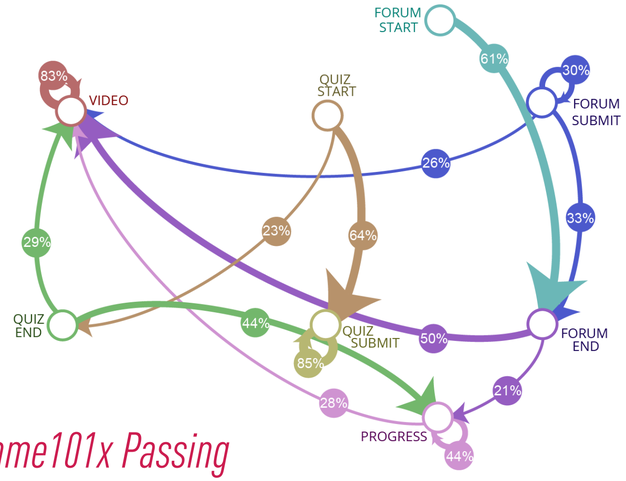

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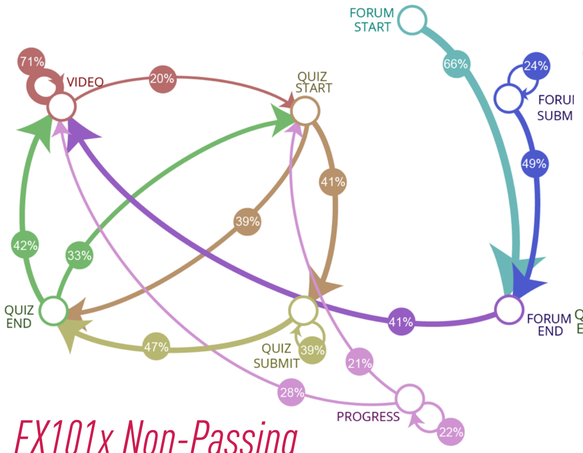

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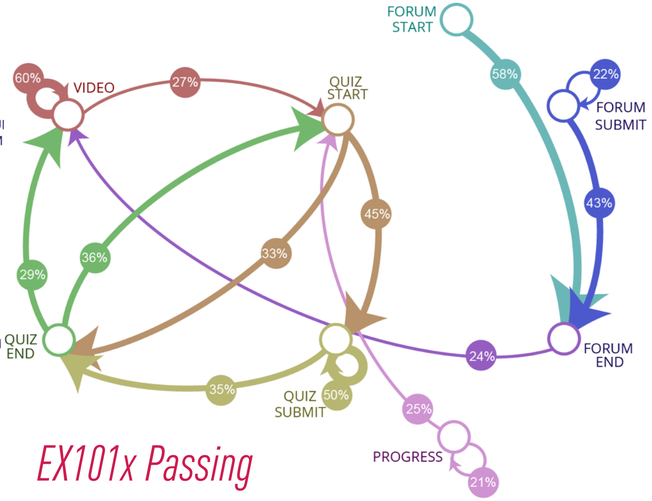

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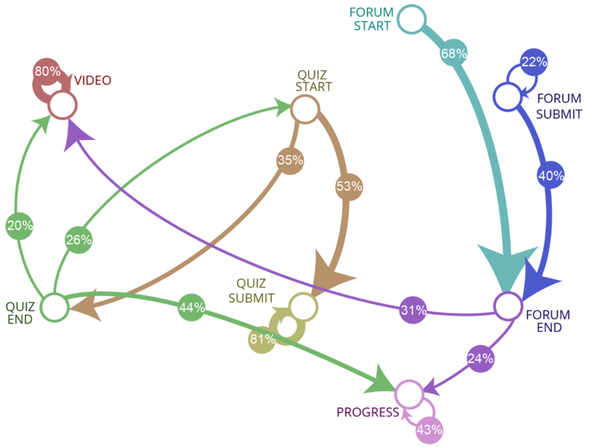

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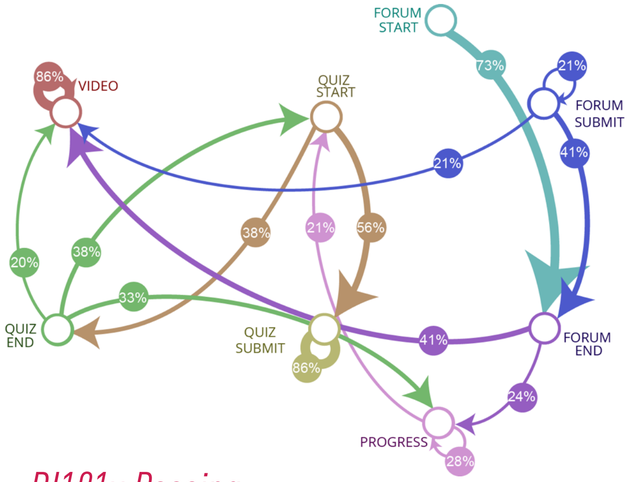

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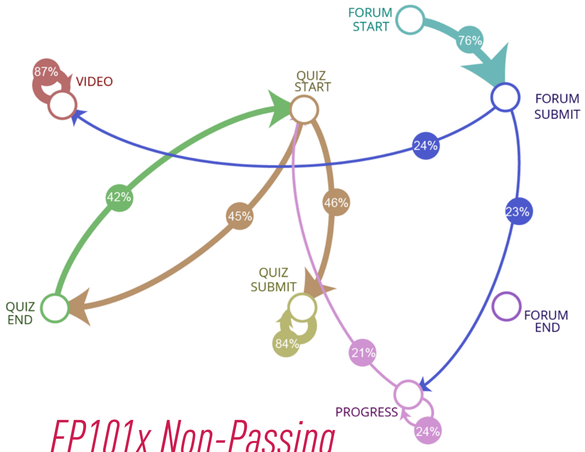

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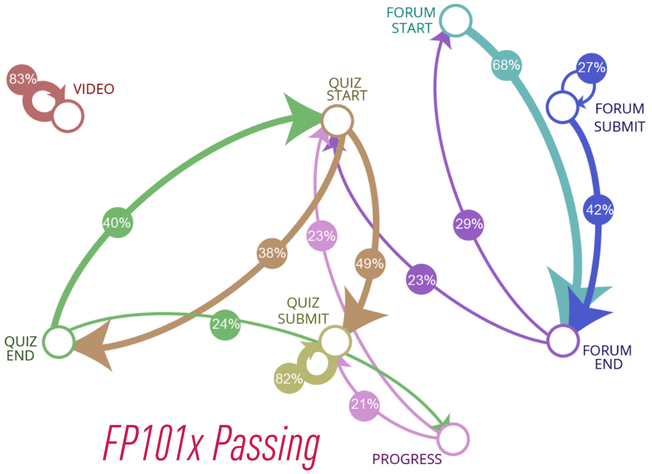

FP101x Passing

APPLICATIONS

1. BEYOND PASS-FAIL SEGMENTATION

2. PATTERN MINING & CONFORMANCE CHECKING

3. POSITIVE DEVIANCE

BIT.LY/WIS-LEARNING-ANALYTICS

THANK YOU

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