



Restoring the Function of 30 Lecture Hall Seats by Fixing Used Furniture on Campus

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ABSTRACT

This project aimed to restore the function of 30 lecture chairs with integrated writing desks at Manado State Polytechnic. Progress reports and notes K01-K30 were analyzed to categorize damages, actions, and results of function inspections. Work from June 8 to September 28, 2026, recorded the replacement of upholstery on all units; 21 units had seat upholstery issues and 17 units had backrest upholstery issues, with eight units having both. Thirteen actions were recorded in June, five in July, four in August, and eight in September. All 30 units showed positive function results. Findings indicate 100% coverage on physical actions, while program reports showed 80% progress. Signed test sheets, cost data, and placement evidence provided a standard safety assessment and utilization impact

INTRODUCTION

Managing campus furniture doesn't stop at buying and getting rid of assets. Lecture chairs with attached writing desks can lose their function because of damage to the upholstery, desk, hinges, or fasteners, even if other parts are still usable. Repairs that start with identifying the condition open up opportunities to extend the furniture's lifespan. In studies on circular furniture design, repair and reuse options are influenced by how easy it is to dismantle components, the quality of the joints, and the compatibility of replacement materials (Pei et al., 2024).

The 2026 Institutional Assignment Service Program of Manado State Polytechnic partnered with the Superior Technology and Product Development Unit (PTPU). The initial proposal aimed to turn furniture waste into two to four academic support products, such as bookshelves, discussion benches, and reading or display tables (Kabo et al., 2026a). Implementation data focused on 30 lecture chairs, each with an integrated writing desk. This refinement is important: one chair and its desk count as a single learning service unit, so the project results are calculated from 30 units, not 60 products (Kabo et al., 2026b).

A chair restoration report needs to answer three different questions. First, what types of damage were found and how often does each category appear? Second, what actions were recorded and how did the function turn out after those actions? Third, what evidence is available to show that the chair is safe, used, and reduces the need for new materials? Descriptive notes are useful for the first two questions, while conclusions about durability and environmental impact require additional measurements. Studies on waste wood for furniture emphasize characterizing the properties of upcycled outcomes, and subsequent research pairs durability testing with economic analysis (Grotowska et al., 2025, 2026).

This article aims to analyze the distribution of damage, the timeline of actions, and the results of descriptive functions on 30 chairs, and then place these findings in the context of reusing campus furniture. The immediate benefits that can be discussed include the recovery of chair and table components based on unit records. Claims about standardized safety, durability for repeated use, cost savings, and emission reductions are limited by the type of evidence available. This distinction is necessary so that campus sustainability practices can be evaluated with measurable indicators (Rodríguez-Guerreiro et al., 2024).

IMPLEMENTATION AND METHODS

Location, Time, Participants, and Data Sources

The activities were reported at the Manado State Polytechnic with UPA PTPU as a partner. The progress report includes documentation of storage or work locations and mentions the PTPU workshop. Actions per unit are dated from June 8 to September 28, 2026. The proposing team consists of four lecturers and eight students according to the endorsement page, but the number of participants present at each session can't be counted from the attendance list because that document wasn't attached (Kabo et al., 2026b).

The main source of the analysis is tables K01–K30 in the latest progress report. Each row records the initial damage, actions taken and dates, as well as notes on functional test results. The proposal is used to check the alignment of

initial goals and outcomes. This article is a descriptive analysis of activity records, not new observations or lab tests. Tracking is done by seat code; installed desks are counted together with their chairs.

Stages of Recovery and Damage Coding

The records cover identifying damage, choosing components that need replacing, working on upholstery or foam, repairing boards or table mechanisms, reinforcing chair fasteners, and tidying up the paint on units that need it. Post-action notes check the repaired components, for example, making sure the seat doesn't shift, the backrest doesn't wobble, and the table is stable or foldable. Technical material relevant for training includes sorting components, repairing joints, doing upholstery work, finishing surfaces, and safety checks. The report doesn't include attendance lists or session curricula, so the description of material follows the type of work recorded, not claims about the amount of training carried out.

For the recap, the initial conditions were grouped into seat cushions, backrest cushions, boards or table surfaces, table mechanisms or fasteners, seat fasteners, backrest fasteners or joints, frame paint, and foot covers. One unit can fall into more than one category. The percentage for each group uses a denominator of 30 chairs; frequencies between groups are not added together to count unique chairs. Descriptions of unclear components are not turned into additional damage categories without written justification.

The number of actions is counted from the date in the action column, not the test date or submission date. Action coverage = number of codes with dates and actions / 30 × 100% (1). Descriptive outcome coverage = number of codes with positive outcome notes / 30 × 100% (2). Both measures explain the completeness and content of the records, not the safe probability, workload capacity, or progress of the entire program output. The calculation is done arithmetically from 30 rows, without inferential testing because all target objects are included in the table.

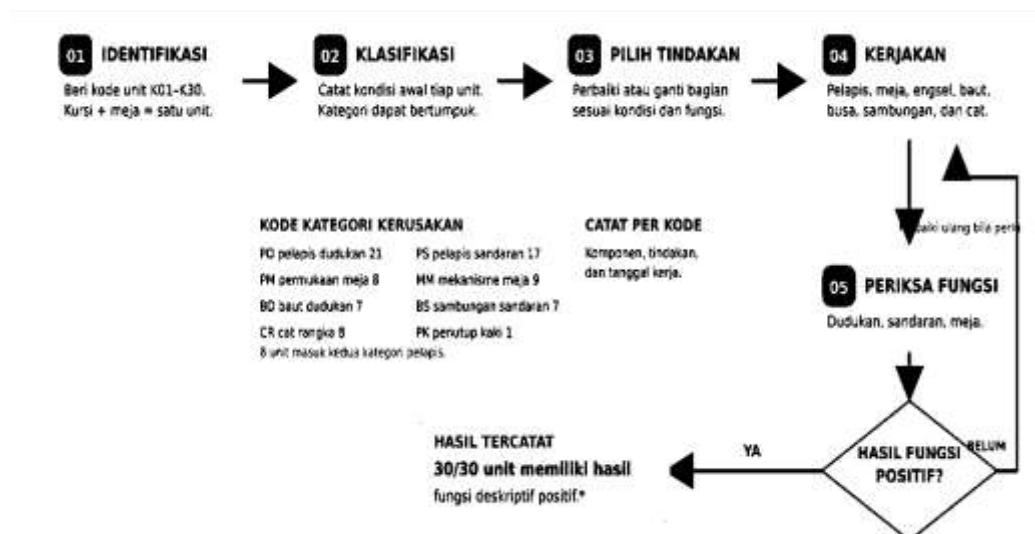


Figure 1. Stages of Recovery and Damage Encoding

RESULTS AND DISCUSSION

Initial Condition And Damage Distribution

All 30 seats have wear or damage on the seat cover, backrest, or both. As many as 21 units have issues with the seat cover and 17 units with the backrest. Eight units, namely K04, K10, K13, K16, K22, K25, K29, and K30, belong to both groups. So, the total number of unique seats across the two cover groups is $21 + 17 - 8 = 30$. The data shows that cover damage is a widespread issue, while mechanical and surface damage appear as a mix in some units (Kabo et al., 2026b).

Table 1. Distribution of Initial Damage Categories on 30 Chairs

Category	n	%	Unit code
Worn or torn mount liner	21	70,0%	K01, K03, K04, K06, K07, K09, K10, K11, K13, K14, K16, K17, K19, K21, K22, K24, K25, K26, K28, K29, K30
Worn or torn backrest liners	17	56,7%	K02, K04, K05, K08, K10, K12, K13, K15, K16, K18, K20, K22, K23, K25, K27, K29, K30
A damaged board or table surface	8	26,7%	K03, K05, K09, K13, K17, K20, K24, K29
Mechanism or table fasteners	9	30,0%	K06, K12, K14, K17, K20, K23, K28, K29, K30
Stand fasteners	7	23,3%	K01, K04, K11, K19, K22, K26, K30
Backup fasteners or connections	7	23,3%	K02, K08, K15, K18, K22, K25, K27
Paint the frame or support	8	26,7%	K07, K10, K15, K18, K21, K24, K27, K30
Leg Cover	1	3,3%	K21

Table 1 contains 78 category markings on 30 chairs. The number 78 reflects combinations of conditions, not the number of chairs or replaced parts. Specifically for board or tabletop categories, K13 has a chipped edge that's been tidied up; the eight markings don't mean eight new boards were installed. Separating the type of damage from the type of action prevents overestimating material needs.

Visual Documentation of Activities

Photos of the furniture area and the upholstery component work. These documents help show the context of the work, but the photos don't include the IDs K01-K30, the date taken, or the before-and-after pairs for each chair. So, the pictures are used as context evidence, while the count of actions comes from the unit table.



Condition of the furniture area in the
report documentation



Documented work on coating
components

Figure 1. Documentation of the Condition and Work on Furniture Included in the Progress Report (Kabo Et Al., 2026b).

Actions and results of each function

Table 2 maintains the relationship between initial conditions, dated actions, and function outcomes for all the code. Sentence summaries are made shorter than the source table so they can be read in article format; details that affect technical decisions are kept. All rows record the replacement of one or both coatings. Some rows also note the replacement of foam, desktop boards, hinges, bolts, foot covers, joint reinforcements, and painting.

Table 2. Notes on conditions, actions, and results of functions K01–K30

	Initial damage	Action 2026	Results of descriptive functions
K01	Tear mount lining; loose bolts	June 8: replace the lining, tighten the bolts	Neat stand, does not shift
K02	Tear backrest lining; rocking backrest	June 9: replace the lining, tighten the bolts	Strong, comfortable backrest
K03	Upholstery of the stand torn; corner of the table is broken	June 10: replace upholstery and table board	Comfortable stand; intact, stable table
K04	Two worn-out liners; loose mount bolts	June 11: replace two liners, new bolts	Neat, strong stand and backrest
K05	Torn backrest; cracked tabletop board	June 12: replace upholstery and table boards	Comfortable backrest; table wearable
K06	Worn-out upholstery of the stand; broken hinges	June 13: replace the upholstery and hinges	The table can be opened and folded

	Initial damage	Action 2026	Results of descriptive functions
K07	Seat torn; frame paint peels off	June 15: replace the upholstery, repaint	Comfortable seat; neat frame
K08	The backrest is torn; the backrest bolt is missing	June 16: replace upholstery and bolts	The backrest does not tilt or wobble
K09	Seat torn; table breaks near fasteners	June 17: tidy up the foam, replace the upholstery and board	Neat stands; sturdy table
K10	Two worn-out coatings; peeling leg paint	June 18: replace two upholstery, paint the feet	Comfortable stand and backrest
K11	The stand is torn; partially detached	June 19: replace the liner and bolts	The stand does not shift
K12	Torn backrest; broken table hinges	June 20: replace upholstery and hinges	Neat backrest; stable table
K13	Two upholstery is damaged; the edge of the table is peeled off	June 22: replace two upholstery, tidy up the edges	Comfortable backrest; edges are not sharp
K14	Rip stand; loose table fasteners	1 Jul: replace the lining, tighten the fasteners	Table does not sway
K15	Removable backrest; worn-out upholstery and paint	8 Jul: new bolts, replace coating, paint	Strong backrest; neat frame
K16	Two torn coatings; deflated mount foam	15 Jul: change foam and two upholstery	Flat sitting; neat backrest
K17	Worn stands; broken boards; worn hinges	22 Jul: replace upholstery, boards, hinges	Stable table, foldable
K18	A torn backing; loose bolts; damaged paint	29 Jul: replace the coating, tighten the bolts, paint	Strong backrest; neat frame
K19	Rip mount; wear fastening holes	Aug 5: fix fasteners, bolts, upholstery	Strong, non-shifting stand
K20	Outdated backrest; table broken; missing bolts	Aug 12: replace the lining, boards, bolts	Intact, stable table

	Initial damage	Action 2026	Results of descriptive functions
K21	Seat torn; dull paint; missing leg cover	Aug. 19: replace upholstery, paint, foot caps	The seat is stable; does not scratch the floor
K22	Two worn upholstery; loose seat bolts	Aug 26: replace two liners, tighten bolts	Dudukan dan sandaran tidak goyang
K23	Torn backrest; broken table hinges	Sep 2: tidy up the foam, replace the upholstery and hinges	The table can be opened and folded
K24	Stand torn; broken table; paint of the supports is damaged	Sep 9: replace upholstery and boards, paint	Strong and flat table
K25	Two torn upholstery; loose backrest	16 Sep: replace two liners and backup bolts	Strong attached backrest
K26	Worn stand; missing bolts	Sep 21: replace the liner and mount bolts	Neat and stable stand
K27	Backrest torn; damaged paint; loose joints	Sep 23: replace the coating, strengthen the joints, paint	The backrest does not shake; the frame is neat
K28	Ripen stand; broken hinges; tilted tables	Sep 25: replace upholstery, hinges, set table	Flat table, foldable
K29	Two worn upholstery; broken table; worn bolts	Sep 27: replace two liners, boards, bolts	Comfortable stand; stable table
K30	Two torn liners; loose bolts; broken hinges; dull paint	Sep 28: replace two coatings, hinges, bolts, paint	Stable chair; functional desk

Positive descriptive results were available for 30 out of 30 units. Based on equations (1) and (2), the coverage of actions and the coverage of result descriptions were both 100%. The sentences in the results column mention the function of the components handled, but the level of inspection depth isn't the same for all units. For example, K06 affirmed that the table can be folded, while K01 confirmed that the seat doesn't shift. So, the 100% figure reflects records with positive results, not load testing outcomes or long-term durability guarantees.

Work timeline

There were 13 actions in June, five in July, four in August, and eight in September 2026. The work in June focused on K01–K13, while September covered K23–K30. This distribution can't be used to assess daily productivity or repair duration, because the table only gives a single action date per unit. Similarly, there's no separate date for function checks apart from the work date.

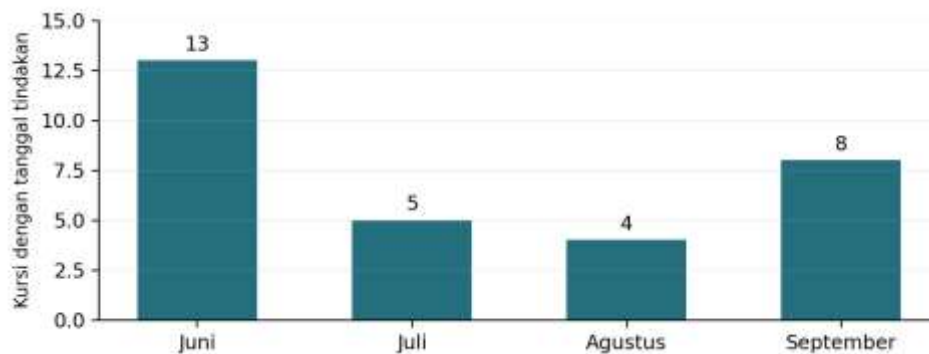


Figure 2. Distribution of 30 Actions by Month in the Date Column; not the Handover Date

Assessment of Results and Their Relation to a Sustainable Campus

At the academic service level, chairs and desks that are refurbished have the potential to be used for learning activities. However, their placement in lecture rooms and user experience haven't been recorded per unit. On the material level, replacing the coverings on all chairs and repairing other components shows a strategy to extend the furniture's lifespan; there's no data on the mass of old materials that lasted, the mass of new materials, or any residue. Because of this, the amount of waste avoided or emissions reduced isn't calculated. Literature on university waste management emphasizes the need for data on waste generation and material diversion to consistently assess sustainability programs (Rodríguez-Guerreiro et al., 2024).

Work on units K17 and K30 shows combined damage: the coating, table components, and joints or finishing all need joint action. In cases like this, replacing just one material isn't enough. Studies on furniture made from waste wood show that choosing reused materials has to take into account the physical properties and quality of the final product (Grotowska et al., 2025). Further durability and economic feasibility studies remind us that the usefulness of upcycled furniture should be judged by performance and cost, not just by how new it looks after repairs (Grotowska et al., 2026). These references serve as a basis for interpretation, not proof that the 30 chairs in this program have passed the same tests.

Table 3. Achievements That Can be Stated and Evidence

Aspects	Report-based insights	Verification limits
Physical actions	30/30 code records repairs; all of them record coating replacements.	Material logs, identity photos, and receipts are incomplete.
Descriptive function	30/30 codes have a positive result description.	Protocols, test dates, checkers, and signed sheets are not available.
Academic use	The potential for 30 units to be reused.	Placement photos, users, and minutes are not yet available.
Materials and cost	Extension of service life is a practical goal.	Material mass, residue, actual cost, and comparator have not been measured.
Partnerships and dissemination	Partners and teams are listed in the document; article manuscripts are compiled.	Attendance list, proof of publication, and adoption documents need to be completed.

CONCLUSION AND RECOMENDATION

Corrective actions were taken on 30 lecture chairs with desks from June 8 to September 28, 2026. All units recorded replacement of the upholstery and reported positive functionality; 21 units had issues with the seat cushions, 17 with the backrest cushions, and eight had problems in both areas. The coverage of physical action records reached 100%, while the program status remained at 80% progress reporting. These results support the potential reuse of the furniture for academic purposes, with the caveat that standardized safety, lifespan, cost savings, and environmental benefits have not yet been measured.

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